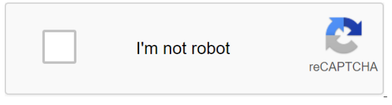
Manual de metrologia pdf



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Decree No. 29 of March 10, 1995 President of the National Institute of Meteorology, Standardization and Industrial Quality - INMETRO, in the performance of his duties; Solution: Article 1 - Changing the terms of Art. 1 Decree No. 102 of June 10, 1988, which begins to have the following formulation: Adopt, in Brazil, a new version of the International Vocabulary fundamental and general terms of metrology, is attached, based on the 211th edition (1993) of the document prepared by the International Bureau of Weights and Measures (BIPM), the International Electrical Commission (IEC), the International Federation of Clinical Chemistry (IFCC), the International Organization for Standardlzation (ISO) , the International Union of Clean Chemistry and (IUPAC) and the International Union of Clean and Applied Physics (IUPAP), with proper adaptation to our language, to the real conditions existing in the country and to those that are already enshrined in use. Art. 2 - Other articles established in Regulation 102 of 10 June 1988 remain unchanged. Art. 3 - This decree will come into force from the day of its publication. JALIO CESAR CARMO BUENO PRESIDENT INMETRO 7. 9INTERNATIONAL DICTIONARY OF FUNDAMENTAL AND GENERAL TERMS OF METROLOGY 8. 10 INTERNATIONAL VOCABULARY OF FUNDAMENTAL AND GENERAL TERMS OF METROLOGY Prambulo Brazilian version In this work, developed and consensado with a significant part of the technical and academic community, active in the field of metrology, we sought not only to focus on aspects of the relevant correspondence of terms between foreign languages, but also the philosophy of the concept of vocabulary. Efforts have been made here to meet the different trends of opinion, as a result of the cultural processes already established in different regions of our country. Thus, the desired and necessary standardization was requested in accordance with the current state of the art of the Brazilian metrological language. In open spaces, some entities are expressed in two different ways for the same definition, sometimes to meet Brazilian needs, sometimes simply to follow the English and French versions. In general, however, the articles listed in the first place remain in the text, and the relevant second options should not be used in the future. The use of brackets (...) by disparaging words and some terms means, as in the original edition, that these words can be omitted, without compromising the content or risk of confusion. In this Brazilian version, the original terms (in English and French) were introduced next to each relevant term in Portuguese, which, together with the trilingual index, should greatly facilitate the search for a term. 9. 11INTERNATIONAL VOCABULARY OF FUNDAMENTAL AND GENERAL TERMS OF METROLOGY It is clear that we could not claim a unanimous job, even because flaws are allowed in the original publication. However, we hope that its strict goal of promoting interdisciplinary harmonization of metrological terminology will be achieved. TERMINOLOGY WORKING GROUP BRAZILIAN GAUGE NETWORK 10. 12 INTERNATIONAL VOCABULARY OF FUNDAMENTAL AND GENERAL TERMS OF METROLOGY 1 Number and Unit 1.1 GREATNESS Attribute of phenomenon, body or substance (MEASURABLE), f, which can be qualitatively outstanding and (measurable) quantified by quantity. greatness (immal) 1) The term greatness may refer to magnitude in the general sense (see example a) or to a certain magnitude (see example b). Examples: (a) Number in general sense: length, time, mass, temperature, electrical resistance, concentration of matter; b) Specific quantities: - bar length - electrical stability of the wire - concentration of ethanol in the wine sample. 2) The quantities that can be classified, one in relation to the other, in order of rise or descending, are called quantities of the same nature. 11. 13MEDUNA LEXICUSAL AND GENERAL CHRIST METROLOGIA 3) Numbers of the same character can be grouped into sets of categories of quantities, for example: - Work, heat, energy. - Thickness, circumference, wavelength. 4) Number symbols are given in ISO 31. 1.2 System OF Set quantities, in a general sense, QUANTITIES, among which there is a certain connection. syst'me de grandeurs 1.3 GRANDEUR OR of magnitude, which, in the number system, is BASE, f by convention, adopted as a functionally numerical base, independent of other magnitude. An example of greatness: Length, mass, and amount of time are generally considered as basic quantities in the field of mechanics. Note: Basic quantities corresponding to the base units of the International System of Units (SI) are given when monitoring paragraph 1.12. 12. 14 INTERNATIONAL VOCABULARY OF FUNDAMENTAL AND GENERAL TERMS OF METROLOGY 1.4 GREATNESS A certain greatness, in the system of quantities, DERIVED, f as a function of the basic quantities of this system. derived magnificence of the number d'riv e Example: In a system that has both basic quantities the length, mass and time, the speed derived amount, is defined as: the length divided by time. 1.5 DIMENSION OF Expression represents the value of ONE MAGNITUDE, the f of the number system, as a product of force-size factors representing the number of major quantities of the system. Dimension d'une Greatness Example: (a) In a system that has as basic quantities of length, mass and time, the dimensions of which are represented by L, M and T respectively, LMT -2 is a measure of strength; (b) In the same system of quantities, ML-3 is a measurement of mass concentration as well as a specific measurement of mass. Observations: 1) Factors representing the main quantities are called the size of these base quantities. 2) For more information on the relevant algebra, see ISO 31-0. 13. 15MEDDY FUNDAMENTAL AND GENERAL TERMS METROLOGY 1.6 GREATNESS OF MAGNITUDE, in dimensional terms of which all DIMENSION One, f exhibitors of the size of the base number of quantities are reduced to zero. Dimension 1 examples: measurement of non-relative linear deformation, friction factor, MACH number, refraction index, ADIMENSIONAL molar faction, f (material quantity faction), mass faction. immeasurable amount of greatness without measuring 1.7 UNIT A specific amount, defined and accepted (DE MEDIDA), f convention, with which other units (measurements) of the same nature are compared with the express unit (mezura) of its values relative to this magnitude. Notes: 1) Units of measurement have names and symbols adopted by the convention. 2) Units of the same dimension can have the same names and symbols, even if the numbers do not have the same character. 1.8 The usual signal symbol, meaning one UNIT measurement. (DE MEDIDA), m unit symbol (example: measurement) (a) m is a symbol of the meter; symbol d'une unit b) A is a symbol of the amplifier. (from mezura) 14. 16 INTERNATIONAL VOCABULARY OF FUNDAMENTAL AND GENERAL TERMS OF METROLOGY 1.9 System OF Assembly of the base units and units (DE DE DEDES, defined under measure rules), m specific, for this system of quantities. Unit (measurement) Examples: syst'me d'unit's a) Internacioanl system of SI units; (from mezura) b) CGS unit system. 1.10 UNIT (DEnved unit of measurement, which can be expressed by MEASURE) (DERIVATIVE) as a product of the agreed force unit, the base f with the proportionality factor one. coherent (received) unit (measurement) Observation: unit (de mesure) Consistency can only be defined in (derive) relation to the basic units of the system. A unit can match one system, but not another. 1.11 A unit measurement system in which all COHERENT DERIVED units are consistent. UNITS (OF MEASURE), m Example: The coherent system of the following units (expressed by their units (measuring) symbols) are part of a system of coherent units agreed in mechanics under the International System of Units d'unit (de mesure), SI: m; Kg; s; m 2; m 3; Hz-1; m.s-1; m.s -2; kg.m-3; Nyq.m.s.-2; Pa-kg.m- 1.s -2; I kg m 2 .s -2; Va-kg.m 2. s -3 . 15. 17MJNY FUNDAMENTAL AND GENERAL TERMOLOGY 1.12 SYSTEM Harmonized Unit System adopted and INTERNATIONAL OF recommended by the General Conference of Weights and Units - SI, m Measures (PMCG). Lnternational System of Units, SI Note: Syst'me International The SI is currently based on the following seven units d'Unit, SI base: MAGNITUDE UNIT SI NAME SYMBOL Length m Mass kg Time according to the electric current of amplifiers Thermodynamic temperature Kelvin K Number mol mol mol mol mol matter matter Luminous Candela cd 1.13 UNIT (a unit of measurement of the base quantity in MEASURE) BASE, f system of quantities. Base Unit (Measurement) Note: Unit (mezur) base In the coherent unit system there is a single base unit for each fundamental value. 16. 18 INTERNATIONAL VOCABULARY OF FUNDAMENTAL AND GENERAL TERMS OF METROLOGY 1.14 UNIT (Measurement Group of Measured Derivative Amount) DERIVED, f in the number system. Derivative Unit (Measurement) Note: Unit (de mesure) de curve for example in SI: MAGNITUDE UNIT SI SYMBOL Newton Force N Energy joule J Pascal pressure Pa 1.15 UNIT (UNIT OF MEASURE, which does not belong to this MEASURE OUTSIDE) unit system. SYSTEM, f out system unit (examples: measurement) a) Electron-volt (approximately one) hors 1.602 18 x l0 -l9 J) is a unit of energy outside the system system in relation to SI; b) Day, hour, minute units of time outside the system in relation to SI. 1.16 MULTIPLE Of Larger units of measurement, which is formed from a unit of a given unit, according to (OF MEASURE), m escalation conventions. Multiple units (measurements) Examples: multiple units d'une a) b) One of the non-decoded multiples of the second is time. 17. 19MJED VOCABULARY FUNDAMENTALY AND GENERAL TERMS METREOLOGY 1.17 SUBmultiPLE Small Dimension Unit which is formed unit (from the unit, according to MEASURE), escalation conventions m. submultiple unit (measurement) Example: sous-multiple d'une unit 1.18 VALUE (Quantitative expression of magnitude), m specific, as a unit valeur (d'une grandeur) Examples: a) Bar length: 5.34m or 534cm; (b) Body weight: 0.152 kg or 152 g; (c) The amount of substance from the water sample (H 2 O): 0.012 mols or 12 mmol. Notes: (I) The value of the quantity can be positive, negative, or zero. 2) The value of the magnitude can be expressed in more than one way. 3) Size values are usually expressed only by numbers. (4) A number that cannot be expressed by a unit multiplied by a number can be expressed by a normal reference scale, or measurement procedure, or both. 18. 20 INTERNATIONAL VOCABULARY OF FUNDAMENTAL AND GENERAL TERMS OF METROLOGY 1.19 VALUE according to the definition of THE INTERNATIONAL Number) Observations: valeur vraie (d'une 1) This value that would have been received by greatness) is the perfect measurement. 2) True values are inherently uncertain. 3) An unspecified article one is used, preferably to an article defined by o in combination with true value, as there may be many values that correspond to the definition of a given value. 1.20 Value, attributed to a specific and true value, adopted, sometimes by convention, as with conventional (OT relevant uncertainty for a given purpose GREATNESS), m. the usual true value (number) Examples: (a) In a given location, the value assigned to the magnitude convention, using the standard vraie (d'une grandeur) reference, can be accepted as the usual true value; b) CODATA (1986) recommended value for permanent Avogadro as A 6,022 136 7 x 10 23 maul -1 . Observations: 1) The usual true value is sometimes referred to as the assigned value, the best score is 19. 21INTERNATIONAL VOCABULARY AND GENERAL TERMINGS of the METROLOGY value, conventional value or reference value. In this sense, the reference value should not be confused with the reference value in the sense that it is used in the observation of paragraph 5.7. 2) A large number of magnitude measurements are often used to establish the normal true value. 1.21 NumerlC VALUE number, multiplying unit in expression (OT one MAGNITUD), m value value. numerical (number) Examples: valeur num'rique In examples in 1.18 number: (d'une greatness) a) 5.34 and 534; b) 0.152 and 152; c) 0.012 and 12. 1.22 SCALE FOR specific quantities of a given character, REFERENCE is a set of orderly, continuous or normal values, f discrete, defined by convention and as a normal reference for classification in order of ascending or scale of the downward quantities of the same nature. Chelle de Repuage VALUE SCALE Examples: REFERENCE, f (a) Mohs hardness scale; The scale of reference values (b) of the PH scale in chemistry; Chelle de Repeuvage c) Octane index scale for fuel derived from oil. 20. 22 INTERNATIONAL VOCABULARY OF FUNDAMENTAL AND GENERAL TERMS OF METROLOGY 2 Dimension 2.1 MEASUREMENT, f Set of operations aimed at determining the value of the value. Mesurage Note: Operations can be performed automatically. 2.2 METROLOGY, f Measuring the science of metrology m'trologie Note: Metrology covers all theoretical and practical aspects related to measurements, regardless of uncertainty, in any field of science or technology. 2.3 PRINCIPLPO DE Science Foundation Measurement. MEASUREMENT, m Measurement Principle Examples: Prince of Mesura a) Thermoelectric Effect, used to measure temperature; (b) The Josephson effect used to measure difference in electrical potential; 21. 23MJNALLAL AND GENERAL TERMING (C) The Doppler effect used to measure speed; (d) The Roman effect used to measure the number of waves of molecular vibrations. 2.4 METHOD Of Logical sequence of operations described by MEASUREMENT, m in general, is used in measurements. Method of measuring mefod de mezur Note: Measurement methods can be qualified in several ways. Among them: - the method of replacement; Differential method - zero method. 2.5 PROCEDURE, described by IN MEASUREMENT, m, is specifically used in specific measuremen measurements, according to this method. Op'rataire (mezur) Note made: The measurement procedure is usually recorded in a document that is sometimes referred to as a measurement procedure (or measurement method) and usually has sufficient detail to allow the operator to perform the measurement without further information. 2.6 MERIMERIA, m Measuring Object. mensurand A specific amount is measured. Mesurand 22. 24 INTERNATIONAL VOCABULARY OF FUNDAMENTAL AND GENERAL TERMS OF METROLOGY Example: The steam pressure of this water sample at 20 o C. Note: Measurement specification may require information on other quantities such as time, temperature or pressure. 2.7 GREATNESS OF Magnitude, which is not a measurement, but which INFLUENCE, f affects the result of measuring this. Effect on the number of greatness d'influence Examples: (a) The temperature of the micrometer used in the measurement of length; Frequency of measurement of ac acid amplitude; c) The concentration of bilirubin when measuring the concentration of hemoglobin in a sample of human blood plasma. 2.8 SIGN Magnitude is a measurement to which MEASUREMENT, m is functionally connected. Signal de mesure Signals Examples: (a) Electrical output signal of the pressurist; b) Frequency converter of voltage frequencies; c) The electrothic force of an electrochemical concentration cell used to measure the difference in concentration. 23. 25MEDAL AND GENERAL TERMIN NOTE: the input signal of the measuring systems can be called an incentive; the output signal can be called the answer. 2.9 Value of the VALUE of the measurement signal representing TRANSFORMED (from the measurement of the data. A MEASURING), m converted value measurand) valeur transforme (d'un mesurand) 24. 26 INTERNATIONAL VOCABULARY OF FUNDAMENTAL AND GENERAL TERMS OF METROLOGY 3 Measurements 3.1 RESULT OF Value attributed to measurements obtained by MERMION, m measurement. as a result of the measurement of r'sultat d'un mesurage Remarks: 1) When the result is given, it must clearly indicate whether it relates to: - indication; Uncorrected result Corrected result and corresponds to the average value of several measurements. 2) The full expression of the result includes information about the uncertainty of measurements. 3.2 DOSDATION (DE Value of the amount provided by the measuring tool; MEASUREMENT), f indication (observations: measuring device) 1) The value read on the dial device can be an indication (d'un can be called a direct indication. 25. 27MJNLJAL AND GENERAL TERMING METROLOGY 2) Magnitude can be a measurement, measuring signal or other value to be used in calculating the measurement value. 3) For the materialized measure, the indication is the value assigned to it. 3.3 RESULT NOT The result of measurement, before correction, GOOD, m due to systematic errors. uncorrected result r'sultat brut 3.4 RESULT Result measurement, after correction, CORRECTED, m due to system errors. corrected result r'sultat correcte 3.5 ACCURACY OF The degree of agreement between the result of MEASUREMENT, f measurement and the true cost of measurement. Accuracy of mezure measurements: 1) Precision is a qualitative concept. 2) The term accuracy should not be used as accuracy. 26. 28 INTERNATIONAL VOCABULARY OF FUNDAMENTAL AND GENERAL TERMS OF METROLOGY 3.6 REPEATABILITY Degree OF Consent Between Results OF SUCCESSIVE MEASUREMENTS OF MEASURING SAME MEASUREMENTS), f performed under the same measurement conditions. Recurrence (measurement results) Observations: r'p'tablilte (des r'sultats 1) These conditions are called measurement conditions) repetitiveness. 2) Recurrence conditions include: - same measurement procedure; The same observer; The same measuring device used under the same conditions; The same place; Repetition in a short period of time. 3) Repeatedly can be quantified depending on the characteristics of the variance of the results. 3.7 RESULTS OF MEASUREMENTS OF THE SAME MEASUREMENT MEASUREMENT, f under different measurement conditions. Reproducibility (measurement results) Observations: (de 1) In order for the expression of reproducibility results to be valid, a modified conditions must be specified. (2) Changed conditions may include: - measurement principle; Measurement method The observer 27. 29INTERNATIONAL LEXICUS FUNDAMENTAL AND GENERAL REANS METROLOGY ∑ ix x () 2 n 1 i - 1 s - measuring device; The benchmark Locals Terms of use It's time. 3) Reproducibility can be quantified depending on the characteristics of the variance of the results. 4) The results mentioned in this tend to relate to corrected results. 3.8 STANDARD DEVIATION For the series of measurements n of the same EXPERIMENTAL, m measurement, magnitude s, which characterizes the experimental standard scattering of results, the formula is given: deviation of the type of trolley exp'rimental, where xi is the result of measuring ith and x represents arithmetic average n results are considered. Observations: 1) Considering a number of n values as a distribution sample, x is a biased estimate of the average μ and s 2 is a biased estimate of the distribution variance. 2) The s/√n expression is an estimate of the standard x distribution deviation and is called an experimental standard middle deviation. _ 28. 30 INTERNATIONAL VOCABULARY OF FUNDAMENTAL AND GENERAL TERMS OF METROLOGY 3) Experimental standard middle deviation is sometimes mistakenly referred to as a standard average error. 3.9 UNCERTAINTY OF Parameter associated with the measurement of MEASUREMENT, f, which characterizes the scattering of uncertainty of values that can reasonably be attributed to the measurement of a single measurement. Nearability of mesur observations: 1) The setting may be, for example, a standard deviation (or multiple of it), or a half of the range corresponding to the established level of trust. 2) Uncertainty measurements usually include many components. Some of these components can be evaluated on the basis of statistical distribution of the results of a series of measurements and may be characterized by experimental standard deviations. Other components that may also be characterized by standard deviations are evaluated by the intended probability distribution based on experience or other information. 3) It is clear that the result of the measurement is the best estimate of the measurement value and that all components of uncertainty, including as a result of systematic impact, such as components associated with corrections and reference standards, contribute to variance. 29. 31M. INTERNATIONAL AND GENERAL TERMEROLOGY Note: This definition was A guide to the uncertainty of measurements detailing its justification (see, in particular, paragraph 2.2.4 and annex D (10)). 3.10 ERROR Result measurement minus value (MEASURING), m true for measurement. error (measurements) erreur (de mesure) Remarks: 1) Since the true value cannot be determined, the usual true value is used in practice (see paragraphs 1.19 and 1.20). 2) When it is necessary to distinguish the error from the relative error, the first is sometimes called the absolute error of measurement. This term should not be confused with the absolute value of the error, which is the error module. 3.11 DEVIATION, m Value minus its reference value. 3.12 RELATIVE ERROR deviation, m measurement error, separated by the true relative value of the measurement object error. erreur relative Note: Because the true value cannot be determined, the usual true value is used in practice (see paragraphs 1.19 and 1.20). 30. 32 INTERNATIONAL VOCABULARY OF FUNDAMENTAL AND GENERAL TERMS OF METROLOGY 3.13 ERROR Result ING is less than average than ALEAT'RIO, m will be the result of an infinite number of random measurements of errors, even measuring, performed in the conditions of repeatability erreur al'atoire. Notes: 1) Accidental error is equal to error minus the systematic error. 2) On the basis that only the final number of measurements can be made, only an estimate of an accidental error can be determined. 3.14 Average ERROR, which will result from an infinite number of SYSTEMATIC, measurements of the same measurement made under the systematic conditions of a repetitive error, minus the true syst'matique erreur measurement value. Notes: 1) System error is equal to error minus accidental error. 2) An analogue of true meaning, system error and its causes cannot be fully known. 3) For the measuring device, see the tend (5.25). 3.15 CORRECTION, f Value algebraically added to the corrected incorrect measurement result to compensate for a system correction error. 31. 33INTERNATIONAL LEXIC OF FUNDAMENTAL AND THE TERMOROLOGY Observations: 1) Correction equals the alleged bias with the exchange sign. 2) Since the systematic error cannot be fully known, the compensation may not be complete. 3.16 Factor of numerical factor by which the non-CORRECTION result corrected to measurement is multiplied by the correction factor to compensate for the bias. facteur correction note: Since systematic errors may not be fully known, compensation may not be complete. 32. 34 INTERNATIONAL VOCABULARY FUNDAMENTAL AND GENERAL TERMS METROLOGY 4 Measuring Devices Many used to describe artifacts used in measurements. This dictionary only determines the choice of preferred terms; the next, more complete list, is organized in about increasing complexity. These conditions are not mutually exclusive. The A-component B-component C-part D-transducer measuring and measuring the device F-reference material G-material materialized H-measuring device I-device J-equipment K-chain measurement L-measuring system M-measuring installation 33. 35INTERNATIONAL VOCABULARY OF FUNDAMENTAL AND GENERAL TERMS OF METROLOGY 4.1 INSTRUMENT OF Device used for measuring, only MEASURING, m or in combination with an additional measuring device (s) device (s). instrument de mesure, appareil de mesure 4.2 MEASURE Device, designed to reproduce or provide, MATERIALIZED, f constant method during its use, one or more material measurements of known values of this magnitude. mesure mat'rialis'e Examples: a) Mass; Volume (one or more values, with or without a scale) c) A standard electric resistor; Standard unit; Standard signal generator; Background material. Note: The amount in question can be described as the amount provided. 34. 36 INTERNATIONAL VOCABULARY OF FUNDAMENTAL AND GENERAL TERMS OF METROLOGY 4.3 TRANSDUCER OF Device, which provides a measured amount of output, m, which has a set correlation with the measurement of the input data of the pre-runner. transducteur de mezur Examples: a) thermocuple; b) Current transformer; c) Electrical voltage sensor; d) pH electrode. 4.4 SEQUENCE CHAIN instrument elements or MEASUREMENT, f measuring system, make up the path of the measuring signal of the measuring chain from stimulus to response. Example of Shaen de Mezur: The electroacoustic measuring circuit consists of a microphone, an atenuator, a filter, an amplifier, and a voltmeter. 4.5 COMPLETE ASSEMBLY SYSTEM measuring and measuring devices, m other equipment combined to perform a measurement system of a particular measurement. syst'mesure, m Examples: (a) Semiconductor conduction measurement equipment; b) Equipment for calibrating clinical thermometers. 35. 37INTERNATIONAL LEXICA FUNDAMENTALAL AND GENERAL TERMOROLOGY Observations: 1) The system may include materialized measures and chemical reagents. 2) A constantly installed measurement system is called measuring systems. 4.6 INSTRUMENT measuring device (MEASURING). DIAL, m mapping (measuring) Examples: tool a) analog voltmeter; apparell (de mezur) b) Digital afficheur c) micrometer. INSTRUMENT (MEASURING) Notes: INDICATOR, m 1) Indication can be analog (continuous/measuring) intermittent) or digital. apparell (de mesure) 2) Values of more than one greatness can be specified at the same time. 3) The indicator measuring device can also provide a record. 4.7 INSTRUMENT measuring device Examples: tool a) barographer; apparell (de mesure) b) thermolinmeceent dosimeter; registrar (c) registrar spectrometer. 36. 38 INTERNATIONAL VOCABULARY OF FUNDAMENTAL AND GENERAL TERMS OF METROLOGY Observations: 1) Recording (indication) can be analog (continuous or intermittent line) or digital. 2) Values of more than one magnitude can be recorded (represented) at the same time. 3) The recorder device can also represent an indication. 4.8 The measurement tool that determines the value (MEASURING) of the instrument by measuring, by means of the sum of the values of TOTAL'ER, partial m of this value, obtained simultaneously or summarizing (measurements) sequentially, from one or more sources. tool apparell (de mesure) Examples: totalisateur a) Total weight of the railway platform; b) Common electricity meter. 4.9 INSTRUMENT measuring value (MEASURING) of one dimension by integrating the INTEGRATOR, m as the function of another. integration (measurement) of the device Example: appareil (de mesure) Electricity counter. int'grateur 37. 39MYNANCE JONATHAN AND GENERAL TERMOROLOGY 4.10 Tool Measuring device, in which output signal (MEASURING) or indication is a continuous function of ANAL'GICO, measuring or input signal. Note analog measuring device: mesure appareil This term is associated with a similar presentation (with affichage) output signal or indication, and not with the principle of the INSTRUMENT instrument. ANALOG display analog indicative instrument 4.11 INSTRUMENT (OT measuring device, providing meriGING signal) DIGITAL, m output or digital indication. digital measuring device Note: appareil de mesure (to this term is associated with the form of performance of the affichage) num'rique exit signal or indication and not to the principle of instrument operation INSTRUMENT. DIGITAL INDICATION, m digitally pointing tool 4.12 DEVICE Part measuring device, which DIALs, m displays the indication. display of the device dispositif d'affichage Remarks: DEVICE 1) This term may include a device on which INDICATOR, m presented or highlighted the value of a materialized measured pointing device. The analog device of the set provides analog guidance; The digital indicator device provides a digital indication. 38. 40 INTERNATIONAL VOCABULARY OF FUNDAMENTAL AND GENERAL TERMS OF METROLOGY 3) Presentation form is called

a semi-digital display, both using a digital indicator, which continuously moves the least significant figure, allowing interpolation, and using a digital indicator supplemented by a scale and index. 4.13 DEVICE Part of the measuring device that provides REGISTER, m registration indication. the recording device dispositif enregistreur 4.14 SENSOR, m Measuring Element or sensor measuring chain, which directly capteur affected by the measurement. Examples: (a) Measuring the connection of a thermoelectric thermometer; b) Turbine rotor to measure flow; c) The Burdon tube of the gauge; (d) Buoy level measuring device; (e) Spectrophotometer Photo element. Note: In some applications, the term detector is used for this concept. 4.15 DETECTOR, m Device or substance indicating the presence of a detector phenomenon does not necessarily provide a detectable value of the associated value. 39. 41MEST AND GENERAL METROLOGY TERMS Examples: (a) Halogen Leak Detector; b) Tornasol paper. Observations: 1) An indication can only be obtained when the value of the magnitude reaches a given limit, sometimes called the detector detection limit. 2) In some applications, the term detector is used as a concept sensor. 4.16 INDEX, m Fixed or mobile part of the device display, an index whose position in relation to the index marks allows to determine the specified value. Examples: (a) Pointer; (b) Bright spot; (c) The surface of the liquid; d) Penalty recorder. 4.17 SCALE (OT ordered set of marks associated with any INSTRUMENT project, which is part of the MEASURING device), f dial measuring device. Scale (measuring device) Note: Chelle (d'un appareil Each brand is called a mesurable label. 42 INTERNATIONAL VOCABULARY OF FUNDAMENTAL AND GENERAL TERMS OF METROLOGY 4.18 LENGTH For this scale, is the length of the SCALE line, m between the first and last mark, the length of the scale passing through the center of all the smaller longueur d'chelle signs. Observations: 1) The line may be real or imaginary, curved or straight. 2) The length of the scale is expressed in units of length, regardless of unit or unit on a scale. 4.19 A range of values limited by INDICATION, f extreme displays. the range of indications of tendu de indications 2) the range of readings is expressed in the units marked on the dial, regardless of the unit of measurement and is usually set in terms of its lower and upper limits, for example: 100 o C to 200 o C; 3) See 5.2. 4.20 DIVISION Part of the scale between the two SCALE, f any successive marks. Division 41 scale. 43INTERNATIONAL JONATHAN FUNDAMENTAL AND GENERAL TERMERS METROLOGY 4.21 LENGTH Distance between any two consecutive marks, FROM DIVISION, M is measured along the scale length line of the scale. longueur d'une division (d'"chelle) Note: The length of the division is expressed in units of length, regardless of the unit of measurement or unit indicated on the scale. 4.22 VALUE OF One Difference between division scale values corresponding to two consecutive marks. Interval of the scale Chelon - valeur d'une Observation: division (d'"chelle) The value of division is expressed in the unit marked on the scale, regardless of the unit of measurement. 4.23 LINEAR SCALE, f Scale, in which the length of the linear division of the scale is associated with the corresponding division of the Channel Chelle by the constant proportionality factor on the scale. Note: The linear scale, the values of which are constant, is called normal scale. 4.24 SCALE NON-Scale, in which each length of linear division, f, is associated with the corresponding non-linear division of the scale by the proportionality factor of a nonlineaic scale, which is not constant on the scale. 44. 44 INTERNATIONAL VOCABULARY OF FUNDAMENTAL AND GENERAL TERMS OF METROLOGY Note: Some non-linear scales have special names, such as the logarithic scale, the square scale. 4.25 SCALE WITH Scale, whose range of indications does not include zero SUPPRESSED, f zero value. supressed-zero scale Chelle and zoro decale Example: Scale of clinical thermometer. 4.26 Scale, in which part of the range of readings occupies EXPANDED, f length of scale, which expands in scale disproportionately larger than other parts of echelle dilet'e. 4.27 DIAL, m Fixed or mobile part of the dial dial dial device on which the scales are located or located. Cadran Note: On some dial devices, the dial is shaped like cylinders or numbered discs that move relative to a fixed index or window. 4.28 NUMBERING ordered set of numbers related to SCALES, scale marks. scale of the number of cipherion d'Une Celle 43. 45INTERNATIONAL VOCABULARY OF FUNDAMENTAL AND GENERAL TERMS OF METROLOGY 4.29 MARKING OF OPERATION OF fixing of the scale marks (in some cases only certain major marks) in relation to MEASUREMENT, f to relevant measurement values. measurement (measuring device) calibrage (d'un instrument de mesure) 4.30 ADJUSTMENT (One operation designed to make the measuring device a homer) m compatible with its use. adjustment (measuring device) Observation ajustage (d'un device Correction can be automatic, semi-automatic mesur) or manual. 4.31 ADJUSTMENT (ADJUSTMENT, using ONLY ONE INSTRUMENT AVAILABLE resources IN THE INSTRUMENT FOR THE USER. MEASUREMENT), f user adjustment (measuring device) r'glage (d'un tool de mesure) 44. 46 INTERNATIONAL VOCABULARY OF FUNDAMENTAL AND GENERAL TERMS OF METROLOGY'S Measurement features Some terms used to describe the characteristics of the measuring device are also applicable to measuring devices, or preview measurement or measuring system and similarity can also be applied to materializing measurement or reference material. The input signal of the measuring systems can be called a stimulus: the output signal can be called the answer. In this chapter, the term measurement means the amount applied to the measuring device. 5.1 NOMINAL RANGE, f Range indication, which can be obtained in the nominal range of a particular position of the sensor measuring device. Observations: 1) The nominal range is usually defined in terms of its lower and upper limits, for example: 100 o C to 200 o C. At zero limit, the nominal range is set at 45. 47MEDUNAGIA LEXIC FOUNDATION AND GENERAL TERMING METROLOGY only in terms of the upper limit, for example: the nominal range from 0V to 100V is expressed as 100V. 2) See. 5.2 notification. 5.2 AMPLITUDE OF Difference, in module, between two nominal range limits, f nominal range. Mesure span intervalle Example: For a nominal range from -10V to 10V, the amplitude of the nominal range is 20V. Note: In some areas, the difference between the largest and smallest value is called the range. 5.3 NOMINAL VALUE, m Rounded or approximate value of the characteristic face value of the measuring device, which is evaluated and assists in its use. Examples: (a) 100 as a value marked on a standard resistor; (b) 1L as a value marked in a container with a volume with one indication; c) 0.1 maul/L as amount of the substance of the solution of slat acid, HCl. d) 25 o C as a pre-selected point of thermostatically controlled bath. 46. 48 INTERNATIONAL VOCABULARY OF FUNDAMENTAL AND GENERAL TERMS OF METROLOGY 5.4 MEASURING RANGE, f Set of values of one measurement range for which range is measured, it is assumed that the error of measuring the mesurable instrument remains within the established limits. WORKING RANGE, f working range Notes: 1) Error is determined in relation to the usual true value. 2) See 5.2 notification. 5.5 CONDLES Terms of use for which the USE characteristics specified as the metrological f nominal operating conditions of the measuring device remain within the established limits. conditions assign a note de fonctionnement: Terms of use usually determine the ranges or values acceptable for measuring and magnitude of influence. 5.6 Extreme CONDITIONS of CONDIS, in which the LIMITS tool, f dimension resists without damage and without deterioration of these metrological characteristics, limiting the conditions, the limits of which remain in the operating conditions for subsequent purposes. Comments: 1) The conditions for storage, transportation and operation may vary; 2) Limits may include limits for measuring and magnitude of influence. 47. 49MED VOCABULARY FUNDAMENTAL AND GENERAL TERMS METROLOGY 5.7 Conditions OF CONDITIONS OF USE prescribed for REFERENCE TEST, f performance of the measuring device or reference conditions for interaction measurement results. Reference Note Terms: Reference conditions usually include reference values or reference ranges for the number of measuredf effects affecting the measuring device. 5.8 CONSTANT A factor by which a direct indication of the instrument, the instrument, must be multiplied by a device, permanent to obtain a specified measurement value or a permanent (d'un value used in calculating the cost of the instrument) measurement. Observations: 1) Measuring devices with multiple ranges with a single dial have several constants that correspond, for example, to different positions of the conference mechanism. 2) When the constant is equal to one, it is usually not indicated on the instrument. 5.9 CHARACTERISTIC The relationship between stimulus and response, f appropriate, under certain conditions. an example of the characteristic caract'ristique reaction: transfert Electro-wind power (fem) thermocouple as a function of temperature. 48. 50 INTERNATIONAL DICTIONARY OF FUNDAMENTAL AND GENERAL TERMS MetroLOGY Observations: 1) Communication can be expressed in the form of a mathematical equation, numerical table or graph. 2) When the stimulus changes as a function of time, the characteristic form of response is the transmission function (Laplace transform the response divided by themes from stimulus). 5.10 SENSITIVITY, f Variation of the reaction of the sensitivity measuring device, separated by the corresponding stimulus sensitivity variant. Note: Sensitivity may depend on the value of the stimulus. 5.11 (THRESHOLD) The big difference in the stimulus that does not produce MOBILITY, m detectable changes in response to discrimination (threshold) measuring device, is the change in (seuil de) mobilit slow and uniform input signal. Note: The mobility threshold may depend, for example, on noise (internal or external) or friction. It may also depend on the cost of the incentive. 49. THE 51-YEAR-OLD DICTIONARY OF FUNDAMENTAL AND GENERAL TERMS OF METROLOGY 5.12 RESOLUTION (THE SLIGHTEST DIFFERENCE BETWEEN THE READINGS OF THE DIAL DEVICE THAT CAN BE TYPED), F IS SIGNIFICANTLY PERCEIVED. Resolution (device display) Notes: r'solution 1) For the device's digital display, there is a variation (d'un dispositif afficheur) in the indication when the least significant figure varies from one block. 2) This concept also applies to the cash register device. 5.13 DERD SON, f Maximum interval in which the stimulus can die band vary in both directions without producing a death change zone in response to the measuring device. Observations: 1) The dead zone may depend on the speed of change. 2) The dead zone can sometimes be intentionally enlarged to prevent changes in response to small differences in stimulus. 5.14 STABILITY, f Измерительный прибор с стабильности, чтобы сохранить его метрологические характеристики константы постоянными с течением времени. Notes: 1) When stability is set at 50. 52 INTERNATIONAL VOCABULARY OF FUNDAMENTAL AND GENERAL TERMS OF METROLOGY In relation to the size, except for time, it should be explicitly mentioned. 2) Stability can be quantified in several ways, for example: by the time the metrological characteristic differs from the given value; or - in terms of changing the characteristics in a given period of time. 5.15 DISCRETION, f The ability of the measuring device to opacity changes the value of the measurement. Examples of discreteness: 1) Scale is a discrete tool for measuring mass. 2) Resistance thermometer, which heats the environment in which the temperature is under the measurement is not restrained. 5.16 DRIFT, f Slow feature variation drift of the measuring device. d'rive 5.17 TIME TIME the interval between the moment that RESPONSE, m stimulus is subjected to sudden variation and instant response time in which the response reaches and remains a summary temps within set limits around its stable end value. 51. 53M. INTERNATIONAL AND GENERAL REVIEW 5.18 Accuracy of A Aptitude measuring device, giving the ANSWER INSTRUMENT close to true value. MEASUREMENT, f precision measurement observation: Precision instrument is a qualitative concept. exactitude d'un tool de mesure 5.19 Class measuring devices that meet ACCURACY, f to certain metrological requirements designed for a precision class to keep errors within certain limits. Note class d'exactitude: The accuracy class is usually indicated by a number or symbol adopted by a convention called a class index. 5.20 ERROR (INDICATION of the measuring device minus THE) ONE true value of the input amount of THE CORRESPONDING INSTRUMENT. MEASUREMENT, m error (indication) of observations: measuring device 1) Since the true value cannot be defined incorrectly (d'indication) d'un, in practice the usual true mezura tool is used (see paragraphs 1.19 and 1.20). 2) This concept is applied mainly when the tool is compared to the benchmark. 3) For the materialized measure, the indication is the value assigned to it. 52. 54 INTERNATIONAL VOCABULARY OF FUNDAMENTAL AND GENERAL TERMS OF METROLOGY 5.21 MAXIMUM ERRORS Extreme error values, permissible PERMISSIBLE (OT ONE specifications, rules, etc., to this measuring device. MEASUREMENT), m maximum allowable errors (measuring device) erreurs maximales tol'es (d'un instrument de mesure) LIMITS OF PERMABLE ERRORS (FROM A MEASURING INSTRUMENT), m limits of allowable error (measuring device) limits d'err Tol'res (d'un instrument de mesure) 5.22 ERROR In POINT The measurement device error in the CONTROL instrument (from the specified indication or on the specified INSTRUMENT VALUE measurement, selected for MEASUREMENT), m control of the instrument. datum error (measuring device) erreur au point de cont'le (d'un instrument de mesure) 53. 55INTERNATIONAL VOCABULARY OF FUNDAMENTAL AND GENERAL TERMS OF METROLOGY 5.23 ERROR IN zero error in the instrument's control point (FROM the instrument measured to zero measurement. MEASURING), m zero error (measuring device) erreur No zero (d'un instrument de mesure) 5.24 INTRINSIC ERROR In reference terms. MEASURING), m internal error (measuring device) erreur intrins'que (d'un instrument de mesure) 5.25 TREND (Systematic error of indication of the instrument MERIGATION (INSTRUMENT. MEASUREMENT), f offset (measuring device observation: tool) The trend of the measuring device is erreur de justesse (d'un usually evaluated in the average instrument errors of the mezura) indicating the corresponding number of repeated measurements. 54. 56 INTERNATIONAL VOCABULARY OF FUNDAMENTAL AND GENERAL TERMS OF METROLOGY 5.26 Exemption from fitness measurement device when providing TREND (from one indication free from bias. MEASURING INSTRUMENT), f freedom from displacement (measuring device) justesse (d'un instrument de mesure) 5.27 REPEATABILITY Measuring Device's ability (OT INSTRUMENT provide very close indications, in repeated MEASUREMENT), f application of the same measurement, with repeated availability (from the same measuring conditions. The same measurement procedure The same observer; The same measuring equipment used under the same conditions; The same place; Repetitions in a short period of time. 2) Repeatedly can be quantified in terms of the characteristics of the variance of readings. 55. 57MYMARDARODAL AND GENERAL TERMOLOGY 5.28 FIDUCIAL ERROR Error measuring device separated (from the instrument a certain value for the instrument. MEASURING), m fiduciary error (observations: measuring device) This value is commonly referred to as erreur r'toite of fiduciary value, and may be, for example, conventionnelle (d'un amplitudes of the nominal range or limit of the mesurable instrument), exceeding the nominal range of the measuring instrument. 56. 58 INTERNATIONAL VOCABULARY OF FUNDAMENTAL AND GENERAL TERMS OF METROLOGY 6 Standard 6.1 Standards, m Materialized Measurement, Measuring, (measuring) a standard reference material or a coupon measurement system designed to determine, execute, save or reproduce a unit or one or more of the quantity that will serve as a reference. Examples: (a) Standard weight 1 kg; b) Standard 100-Ω resistor; c) Standard ammeter; d) Sesio frequency standard; (e) Standard hydrogen electrode; (f) A reference solution to cortisol in a person's serum with a certified concentration. Observations: 1) A set of similar materialized measures or measuring devices that are used together represent a collective standard. 57. 59INTERNATIONAL DICTIONARY FUNDAMENTAL AND GENERAL OF METROLOGY 2) A set of templates of selected values that, individually or collectively, form a series of values of the number of the same character, is called a standard collection. 6.2 STANDARD STANDARD, recognized by INTERNATIONAL AGREEMENT, m serve internationally as the basis for the immoderate setting of other standard standards (measurements) to which it refers. The international system 6.3 STANDARD, recognized by the national decision of NATIONAL, m serve as the country as a basis for assigning national (measuring) values to other standards of magnitude to which it refers. The standard 6.4 STANDARD, which is designated or widely PRIMARY, m is recognized as having the highest primary standard metrological qualities and whose value is accepted without reference to other standards of the same scale. Note: The concept of the primary pattern is equally valid for base quantities and derivative quantities. 6.5 STANDARD STANDARD, the value of which is set by SECONDARY comparisons, m to the primary standard of the same magnitude. secondary standard Talon secondaire 58. 60 INTERNATIONAL VOCABULARY OF FUNDAMENTAL AND GENERAL TERMS OF METROLOGY 6.6 STANDARD STANDARD, generally having the highest quality REFERENCE, metrological m, available in this local or reference standard of this organization, from which the full of reframe measurements derives. 6.7 STANDARD STANDARD is commonly used for calibration or WORK, m control materialized measurements, standard measuring devices or reference materials. Travail observation benchmark: 1) The working pattern is usually calibrated compared to the reference standard. 2) A working pattern commonly used to ensure that measurements work properly is called a control pattern. 6.8 STANDARD STANDARD is used as an intermediate for TRANSFER, m compare patterns. Ticket de transfer note standard: The expression transfer device should be used when the middleman is not the standard. 6.9 STANDARDE, sometimes a special structure, ITINERANT, m, which will be transported between different places. Travel standard example of talon voyageur: The standard frequency of the cuzium, portable, is controlled by the battery. 59. 61MESTANAROD AND GENERAL TERMING METROLOGION 6.10 Possession is the result of measurement or TRACEABILITY, the f value of the standard associated with established traceability references, usually to national standards or international tracys, through a continuous chain of omparations, all of them have established uncertainties. 1) The concept is usually expressed by a traceable adjective; (2) A continuous chain of comparisons is called a traceability chain. 6.11 CALIBRATION, f A set of operations that establishes, in accordance with these calibration conditions, the relationship between the benchmark values specified by the Scouting measuring instrument or the measuring system, or the values presented by the materialized measure or reference material, and the corresponding values of the quantities set by the standards. Observations: 1) The calibration result allows both the measurement to be set to be used for readings and the definition of corrections. 2) Calibration can also identify other metrological properties, such as the influence of influence values. 60. 62 INTERNATIONAL VOCABULARY OF FUNDAMENTAL AND GENERAL TERMS OF METROLOGY 3) The calibration result can be recorded in a document sometimes referred to as a calibration certificate or calibration report. 6.12 Conservation Set of Operations required to maintain OT STANDARD, f metrological standard characteristics, retention within appropriate limits. a (measurement) standard preservation d'un ' coupon Note: Operations usually involve periodic calibration, proper storage and careful use. 6.13 Material MATERIAL or substance that has one or more REFERENCE (MR), m values of properties that are fairly homogeneous and well-established Reference Material (RM) to be used by the Regulation of Matter u Matter in the calibration apparatus, in the evaluation (MR) method of measuring or assigning material values. Note: The reference material can be a pure substance or mixture, in the form of gas, liquid or solid. Examples include water used in the calibration of viscometers, sapphire as a calorific caloric caloric calibration, and solutions used for calibration in chemical analysis. Identification and observation extracted from iso manual 30:1992. 61. 63INTERNATIONAL DICTIONARY OF FUNDAMENTAL AND GENERAL TERMS OF METROLOGY 6.14 MATERIAL REFERENCE MATERIAL, accompanied by a certified REFERENCE, with one or more CERTIFICATE values (MRC), m properties, and certified by a reference procedure that establishes its traceability to the exact material (CRM) of the purchase unit in which the values of the Matero de Roerich properties are expressed, and each certified value is a Certificate (MRC) accompanied by uncertainty for a set level of trust. Notes: 1) The certificate of reference material is determined in paragraph 4.2. 2) MRC is usually prepared in batches for which The value of each property considered is determined within the uncertainties set by the measurements in the representative samples of the entire lot. 3) Certified properties of certified reference materials are sometimes obtained comfortably and reliably when the material is incorporated into a specially manufactured device, for example: three-object matter, known in three cell points, glass with a known optical density in the transmission filter, homogeneous granulometric spheres installed on the blade in a microscope. These devices can also be considered MRC. This definition and observation were derived from iso 30: 1993. 62. 64 INTERNATIONAL VOCABULARY OF FUNDAMENTAL AND GENERAL TERMS OF METROLOGY 4) All IRC meet the definition of the standards set in the International Dictionary of Fundamental and General Terms of Metrology (WIM). 5) Some IRKs and IRC have properties that, because they do not correlate with the established chemical structure or for other reasons, cannot be defined by precisely defined methods of physical and chemical measurement. These materials include some biological materials, such as vaccines, for which the World Health Organization has identified an international unit. 63. 65INTERNATIONAL DICTIONARY OF FUNDAMENTAL AND GENERAL TERMS OF METROLOGY 64. 66 INTERNATIONAL JOURNAL OF FUNDAMENTAL AND GENERAL TERMS OF METROLOGY MEASUREMENT 6.11 Adjustment (measuring device)