



Acronyms – Definitions – Terms

In the world of metrology and calibration specifically, there are a number of acronyms, definitions, and terms which are used when discussing the calibration process. It is very easy to get confused when talking about *calibration*, *verification*, *NIST*, *uncertainty* and so forth. Additionally, there are specific acronyms, definitions, and terms used within the nuclear industry. The following discusses some of these acronyms and terms with correct definitions.

The information presented is from the following documents and is by no means a complete list. The reader is encouraged to read these documents if a more in-depth review is needed.

- *International Vocabulary of Metrology—Basic and General Concepts and Associated Terms*: 2008, (VIM)
 - *ISO/IEC Guide 99, ISO/IEC 17000*
 - *The Guide to Measurement Uncertainty GUM*: 2008
 - *Section 206 - Energy Reorganization Act of 1974*
 - *10 CFR21* of the Nuclear Industry
1. **Accreditation**: – formal recognition by an independent science-based organization that the laboratory is *competent* to perform specific tests. (Committee on Conformity Assessment)
 2. **Accuracy (of measurement)**: – closeness of agreement between a measured *quantity value* and a true *quantity value* of a measurand. [VIM: 2008, 2.13] (See *Error*)
 3. **Adjustment**: – set of operations carried out on a measuring system so that it provides prescribed indications corresponding to given values of a quantity to be measured. [VIM: 2008, 3.11] (See *Calibration and Verification*)
 4. **Calibration**: – operation that, under specified conditions, in a first step, establishes a relation between the *quantity values* with *measurement uncertainties* provided by *measurement standards* and corresponding indications with associated *measurement uncertainties* and, in a second step, uses this information to establish a relation for obtaining a measurement result from an indication. [VIM: 2008, 2.39] (See *Adjustment and Verification*)
 5. **Defect**: – The non-fulfillment of an intended usage requirement or reasonable expectation, including one concerned with safety. The expectation must be reasonable under the circumstances. When related to a nuclear facility, a *defect* is a *deviation* in a basic component delivered to a purchaser for use in a facility or an activity subject to the regulations (*10CFR21*) based on an evaluation, and the *deviation* could create a substantial *safety hazard*. [*10CFR21*]
 6. **Deviation**: – A departure from the technical requirements included in a procurement document. [*10CFR21*]



7. **Error (of measurement):** – measured *quantity value* minus a reference quantity value. [VIM:2008, 2.16]
(See *Accuracy* and *Uncertainty*)
8. **International System of Units – SI (Système International d’unités):** – system of units, based on the *International System of Quantities* (ISQ), their names and symbols, including a series of prefixes and their names and symbols, together with rules for their use, adopted by the General Conference on Weights and Measures. (CGPM) [VIM: 2008, 1.16]
9. **Measurement:** – process of experimentally obtaining one or more *quantity values* that can be attributed to a quantity. [VIM: 2008, 2.1].
10. **Measurement Standard:** – realization of the definition of a given quantity, with stated *quantity value* and associated *measurement uncertainty*, used as a reference. [VIM: 2008, 5.1].
11. **Metrology:** – science of measurement and its application. [VIM:2008: 2.1]
12. **National Measurement Standard:** – *measurement standard* recognized by national authority to serve in a state or economy as the basis for assigning *quantity values* to other *measurement standards* for the kind of quantity concerned. [VIM:2008, 5.3]
13. **NIST:** – *The National Institute of Standards and Technology (NIST) was founded in 1901 and is now part of the U.S. Department of Commerce. NIST is one of the nation's oldest physical science laboratories. Congress established the agency to remove a major challenge to U.S. industrial competitiveness at the time — a second-rate measurement infrastructure that lagged the capabilities of the United Kingdom, Germany, and other economic rivals. The NIST maintains the measurement standards for the United States.*
14. **NRC:** – *The Nuclear Regulatory Commission*
15. **Reference Standard:** – *measurement standard designated for the calibration of other measurement standards for quantities of a given kind in each organization or at a given location.* [VIM: 2008, 5.6]
16. **Risk:** – effect of *uncertainty* on objectives. *Risk* can also be viewed as the probability/threat of damage, injury, liability, loss or any other negative occurrence that is caused by either external or internal vulnerabilities that may be avoided through pre-emptive action. [ISO 31000:2009. ISO Guide 73:2002].
17. **Substantial Safety Hazard:** – A loss of safety function to the extent that there is a major reduction in the degree of protection provided to public health and safety for any facility or activity licensed, other than for export. [10CFR21]
18. **Traceability (metrological):** – property of a measurement result whereby the result can be related to a reference through a documented unbroken chain of *calibrations*, each contributing to the *measurement uncertainty*. [VIM: 2008, 2.41] (See *International System of Units*)
19. **Uncertainty of Measurement:** – non-negative parameter characterizing the dispersion of the *quantity values* being attributed to a measurand, based on the information used. [GUM: 2008, 2.26] (See *Error*)
20. **Validation-Validate:** – confirming that the specified requirements are adequate for an intended use. [VIM: 2008, 2.45]
21. **Verification:** – provision of *objective evidence* that a given item fulfils specified requirements. [VIM: 2008, 2.44]