



NORWEGIAN OFFSHORE
DIRECTORATE

Metrological glossary

Appendix 1 to the Guideline to the Measurement Regulation

Metrological glossary

Adjustment, defined in the Regulation: 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. A calibration is a prerequisite for an adjustment.

Allocation measurement, defined in the Regulation: measurement where the measurement result is included in an allocation. This does not comprise delivery measurement and CO₂ tax measurement.

Allocation, defined in the Regulation: a mathematical process for determining what quantity of produced petroleum of a total production from the entire production system shall be assigned to an individual field/production license.

Analysis methods, methods used for chemical analysis.

Associated measuring instrument, defined in the Regulation: an instrument used to measure certain quantities that are characteristic for the fluid, and which are used as input quantities or a correction in a measurement model.

Audit trail, defined in the regulation: documentation that makes it possible to reconstruct the course of events.

Automatic sampler, defined in the Regulation: a system capable of taking representative samples from fluids flowing through a pipe. The system consists of at least a sampling probe, an associated control unit and a sample container.

Base prover volume, the volume of the displacement prover at reference conditions, as shown on the calibration certificate, and obtained by the arithmetic mean of an acceptable number of consecutive calibration runs.

Bias (measurement bias), estimate of a systematic measurement error.

Calibration curve, defined in the Regulation: expression of the relation between indication and corresponding value measured with a measurement standard.

Calibration factor, defined in the Regulation: a quantity, with or without a unit, that expresses the relationship between the indication and the reference value. The term is intended to cover both what is internationally called "meter factor" and "K-factor".

Calibration, defined in the Regulation: operations to determine, under specific conditions, the relationship between the indication of the instrument being calibrated and the value of a traceable measurement standard with documented uncertainty.

Checksum, a code used to check the integrity of data, or the mathematical function of the data.

Chemical analysis, determination of the physical properties or the chemical composition of samples.

CO₂ tax measurement, measurement where the measurement result forms the basis for calculating CO₂ tax.

Competence, the ability to apply knowledge and skills to perform an activity.

Correction, defined in the regulation: a quantity in a measurement model that compensates for an estimated systematic error.

Delivery measurement (Custody transfer measurement), defined in the Regulations: measurement with the purpose of obtaining quantity and quality information for use as physical and financial documentation in the event of changes in ownership and/or in connection with transporting petroleum by ship or pipeline to an onshore terminal.

Direct measurement or direct measurement method, defined in the Regulation: measurement method where the value of a measurand is obtained directly without the need for supplemental calculations based on a functional relationship between the measurand and other measured quantities. The measurement method remains direct even if supplemental measurements of influence quantities are necessary to make corrections.

Displacement prover, defined in the Regulation: equipment for proving oil meters, based on displacement of a body through a calibrated pipe.

Disturbance, defined in the Regulation: an influence quantity with a value that is outside the designated rated operating conditions for a measuring instrument or measuring system.

Equation of state, thermodynamic equation describing the state of the fluid under a given set of physical conditions.

Flow calibration, calibration where a fluid flows through the meter.

Flow proportional sample, sample taken from a pipeline such that the sampling frequency throughout the sampling period is proportional to the flow rate of the fluid in the pipeline.

Flow rate range (interval), the range between the minimum flow rate and the maximum flow rate.

Flow rate, quantity (volume, mass and energy) per unit time of a fluid flowing through a meter or measuring system.

In situ calibration, calibration of the measuring instrument or measuring system at the current operating conditions at the place of use.

Indication, defined in the Regulation: value given by a measuring instrument or measuring system.

Indirect measurement or indirect measurement method, defined in the Regulation: measurement method where the value of the measurand is calculated through a functional relationship between other measurands, where these were obtained through direct measurement methods.

Influence quantity, defined in the Regulation: a quantity that is not the measurand, but which affects the measurement result. For example, influence quantities may be linked to weather-related, electrical and mechanical ambient conditions.

Input quantity, quantity to be measured, or otherwise determined, to calculate the value of a measurand. Corrections and influencing quantities can be the input quantity to a measurement model.

Installation effects, defined in the Regulation: any difference in the performance of a measuring instrument or measuring system that occurs between the calibration under ideal conditions (laboratory conditions) and the actual operating conditions. For flow meters, this difference may be caused by different flow conditions due to the speed profile and disturbances, or by different operating conditions.

Instrumental bias, average of replicate indications minus a reference value.

Instrumental drift, continuous or incremental change over time in indication, due to changes in metrological characteristics of the measuring instrument.

Instrumental measurement uncertainty, defined in the Regulation: part of measurement uncertainty coming from a measurement instrument or measuring system in use.

K-factor, the ratio of the number of pulses generated by a meter to the quantity passing through a flow meter (pulses per unit volume or mass).

Limit value, defined in the Regulation: maximum value for measurement error or uncertainty in the measurement of fluid characteristics and metrological characteristics.

Linearity, defined in the Regulation: a measuring instrument's ability to respond proportionally to the value of a quantity.

Management system (for measurement), the activities, systems, processes and procedures used to plan, implement, evaluate and correct activities to ensure compliance with the requirements laid down in or pursuant to this Regulation. The term management system includes internal control.

Master meter prover, defined in the Regulation: system of one or more master meters and associated equipment used to prove other meters.

Master meter, defined in the Regulation: calibrated meter that is used to prove other meters.

Maximum permissible error of measurement or error limit, defined in the Regulation: the maximum permissible deviation from a reference value allowed for a measurement, measuring instrument or measuring system.

Measurand, defined in the Regulation: quantity intended to be measured.

Measured value, the value of a quantity representing a measurement result.

Measurement data, data included in a measurement.

Measurement error, defined in the regulation: measured quantity value minus a reference quantity value.

Measurement method, defined in the Regulation: generic description of operations involved in a measurement.

Measurement model, defined in the Regulation: mathematical relation among all quantities known to be involved in a measurement.

Measurement period, defined in the Regulation: time interval between first and last measurement in a series or time interval for one measurement.

Measurement principle, phenomenon or process that forms the basis of a measurement.

Measurement procedure, detailed description of a measurement according to one or more measurement principles and to a given measurement method, based on a measurement model and including any calculation to obtain a measurement result.

Measurement result, defined in the Regulation: values attributed to a measurand along with other relevant information, including measurement uncertainty.

Measurement standard, realisation of the definition of a given quantity, with given value and specified uncertainty, used as a reference.

Measurement uncertainty or uncertainty, defined in the Regulation: parameter which characterises the dispersion of the values being attributed to a measurand. Measurement uncertainty is understood as expanded or relative expanded measurement uncertainty calculated with a coverage factor of 2, giving a confidence level of 95.45 %.

Measurement unit, a scalar quantity, defined and adopted by convention, used as a basis of comparison to establish the value of physical quantities or features that can be measured.

Measurement, as defined in the Regulation: process of experimentally obtaining one or more quantity values that can reasonably be attributed to a quantity. In addition to direct physical comparison, the process can include use of models and calculations based on theoretical considerations.

Measuring instrument, instrument used for measurement, alone or together with supplementary equipment.

Measuring system, defined in the Regulation: set of one or more measuring instruments and often other components, assembled and adapted to provide information that is used to produce measurement values within specified intervals for quantities of specified kinds.

Meter or flowmeter, defined in the Regulation: instrument to perform continuous measurements of the volume and mass of a fluid under dynamic conditions.

Meter tube, defined in the Regulation: pipe section with meter(s) and potentially sections for flow conditioning upstream and downstream of meter(s).

Metrological characteristics, particular characteristics of a measuring instrument or measuring system that can influence the result of a measurement and that can be verified.

Metrological traceability, defined in the Regulation: property of a measurement result whereby the result can be traced to a reference through a documented and uninterrupted series of calibrations that each contribute to the measurement uncertainty.

Multiphase flow, simultaneous flow of fluids with two or more thermodynamic phases (see guidance to Chapter 7).

Multiphase meter, a meter for measuring individual oil, water and gas flow rates in a multiphase flow.

Net standard volume, the total volume of oil excluding sediment and water, corrected to reference temperature and pressure.

Operating conditions, defined in the Regulation: values of the measurand and influence quantities under which measuring instruments and measuring systems operate.

Output quantity, measured value calculated by applying values to input quantities in a measurement model.

Performance (of a measuring instrument and measuring system), characteristics defining the ability of a measuring instrument or measuring system to achieve the intended functions.

Probe, tube that transmits measured quantity to measuring instrument.

Produced (quantity) petroleum, defined in the Regulations: petroleum produced and sold, as well as petroleum produced for sale from fields in production and fields that have been shut down. Petroleum delivered free of charge or as compensation for another party is not considered sold.

Prover, defined in the regulation: equipment for proving flow meters in measuring systems for continuous and dynamic measurement of oil.

Proving or prove, defined in the Regulation: in situ calibration to determine the calibration factor of a meter.

PVT (pressure-volume-temperature) data, data used in equations of state for a multiphase fluid to calculate phase transitions and to describe the physical properties of the fluid for a given set of composition, pressure and temperature.

Quantity value or value, a combination of number and measurement unit, where the number indicates how many measurement units the quantity consists of.

Quantity, property of a physical object, a phenomenon or anything else that can be quantified by measurement.

Rated operating conditions, defined in the Regulation: operating conditions that must be fulfilled during a measurement in order for a measuring instrument or measuring system to perform as designed.

Reference conditions, temperature and pressure conditions to which the measurements are referenced.

Reference material, material that is sufficiently homogeneous and stable and that is suitable for its intended use in measurement.

Reference value, value used as a basis for comparison with quantity values of the same kind.

Repeatability conditions, conditions involving repeated measurements on the same or similar objects over a short period of time at the same location with the same measurement procedure, operators, measuring system and operating conditions.

Repeatability, defined in the Regulation: the degree of concurrence between the results of subsequent measurements of the same quantity, carried out using the same method, under the same conditions, by the same observer, using the same measuring system and with brief time intervals.

Representative sample, defined in the Regulation: sample with a composition equal to the composition of the quantity from which the sample was taken.

Reproducibility conditions, conditions involving repeated measurements on the same or similar objects at different locations with different operators and measuring systems.

Reproducibility, measurement precision at reproducibility conditions.

Retention time, the time it takes for a particular gas component to move through the column to the detector of a gas chromatograph.

Sampler, a system capable of extracting a representative sample from fluid flowing in a pipe. This system may be automatic or manual, continuous or intermittent.

Sampling, defined in the Regulation: all steps carried out to obtain a sample that is representative of the content of a pipe, tank or other container where the content shall be analysed.

Sensor, part of a measuring instrument or measuring system that is directly affected by the measurand and that generates a signal related to the value of the measurand.

Single-phase flow, flow of fluid with one thermodynamic phase (see guidance to Chapter 7).

Stability of a measuring instrument (instrumentell stabilitet), the ability of a measuring instrument to maintain its metrological characteristics over time.

Systematic measurement error, defined in the Regulation: component of a measurement error that in replicate measurement remains constant or varies in a predictable manner.

Test sample, extract from the sample can or sub-sample that is added to the analyser. The entire test sample is used in the analysis.

Transition flow rate, the flow rate through a meter where performance requirements may change.

Uncertainty budget, defined in the Regulation: statement of a measurement uncertainty, of the components comprised by this measurement uncertainty and of their calculation and combination.

Uncertainty limit (target measurement uncertainty), defined in the Regulation: upper limit for measurement uncertainty, determined based on the intended use of measurement results.

Validation, defined in the Regulation: confirmation that the requirements for a certain intended use or application have been fulfilled.

Verification, as defined in the Regulation: confirmation that specified requirements have been fulfilled.

Working range, defined in the Regulation: range defined by two values of a quantity that, under specific conditions, can be measured using a given measuring instrument or measuring system with a specified.

Working standard, measurement standard routinely used for verification and calibration of measuring instrument and measuring system.