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Guidance on Practice for Fluid Measurement Management

GP 64-01

**BP GROUP
ENGINEERING TECHNICAL PRACTICES**

Foreword

This is the first issue of Engineering Technical Practice GP 64-01. This Guidance on Practice (GP) is based on collaborative efforts of measurement experts representing upstream and downstream segments of BP and input from a global measurement users group.

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1. Scope

This GP provides guidance for management of the installation, maintenance and operation of fluid quantity and quality measurement equipment and systems, either dynamic or static.

This document summarises essential management considerations as guidance for compliance with GP 64-00 and facilitation of system acceptability. ETP Category 64, Measurement, documents classify systems according to the application and use of the measurement data generated. The applicability of the guidance will vary in depth depending on the class of the measurement equipment or system.

For general process monitoring and control, reference should be made to ETP Category 30, Instrumentation & Control documents.

2. Normative references

The following normative documents contain requirements that, through reference in this text, constitute requirements of this technical practice. For dated references, subsequent amendments or revisions of any of these publications need not apply. However, parties to agreements based on this technical practice are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies.

BP Engineering Technical Practices (ETP)

GP 64-00	Guidance on Practice for Measurement Management Systems
GP 64-02	Guidance on Practice for Dynamic Measurement Systems
GP 64-03	Guidance on Practice for Static Measurement Systems
GP 64-04	Guidance on Practice for Fluid Quality Measurement Systems

International Organization for Standardization (ISO)

ISO 10012	Measurement management systems – Requirements for measurement processes and measuring equipment.
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3. Classification of fluid measurement applications

3.1. General

- a. Fluid measurement systems shall be classified by BP, depending on the purpose of application and the required uncertainty of measurement.

The categories for measurement applications defined in this section are for general guidance. There may be applications where a higher, or lower, standard of measurement uncertainty is required than the general classification implies. For example, even in fiscal, custody transfer or allocation applications, the fluid volumes involved may not justify the high expense of a Class 1 system as defined in ETP Category 64, Measurement, documents and provided that the agreement of the other interested parties and the fiscal authorities can be obtained, a reduced standard of measurement may sometimes be acceptable based on the relative financial risk through measurement error.

Conversely, for some plant mass balance or accounting measurements, a higher than Class 2 level of measurement may be required. In general, high value, high importance and high throughput applications require high accuracy measurement



systems while applications of low value and importance require less accurate equipment and less rigorous procedures. However, the overriding factor in specifying a fluid measurement system should be 'fitness for purpose'.

3.2. Class 1 measurement systems

- a. The calibration of Class 1 measurement equipment shall be periodically checked against certified testing equipment using calibration procedures approved by the interested parties.

The requirements for periodic calibration checking will normally be specified by the fiscal authority or by the parties to the commercial transaction.

- b. Class 1 measurement systems shall incorporate equipment features and procedures enabling full and traceable control of all system operations.

Class 1 measurement typically refers to fiscal, custody transfer, and allocation use. It is the most stringent application, with ancillary equipment or test and inspection methods required to prove the accuracy and repeatability of the system.

The international standards for fiscal and custody transfer measurement are well recognised by most legislative authorities and by other interested parties. However, additional constraints are sometimes imposed, in particular, by national regulatory bodies. Additionally, commercial contractual requirements may dictate measurement specifications for design and operation.

The ETP Category 64, Measurement, guidelines for Class 1 systems should be applied wherever possible. However, where production from a BP operated facility is routed via a third party operator's facility or gathering station, this operator may require that equipment selected for BP's Class 1 measurement system be modified or enhanced such that equitability is maintained with the operator's 'Class 1' system. For example, this operator may specify that a piece of equipment from a particular manufacturer be used.

Specific requirements should be specified in the 'Oil and Gas Transport Agreement' or similar contract document. Otherwise, the requirements should be discussed, agreed and documented by the concerned parties at an early stage during preparation of the measurement system specification.

3.3. Class 2 measurement systems

- a. Class 2 measurement systems may meet a lower standard of accuracy and repeatability than Class 1 systems.
- b. Class 2 measurement systems may be simpler and have less demanding calibration or proving and control requirements than Class 1 systems.

Class 2 typically refers to mass balance applications, leakage detection, emissions monitoring, allocation, inventory and stock reporting and internal accounting purposes. Such systems typically have less frequently required routine testing.

In certain regions, fuel and emissions measurement systems, when related to green house gas reporting and CO2 trading, will be subject to regulatory requirements and as such are classed as fiscal measurements. Similarly, allocation schemes required to a lesser accuracy than might be associated with a Class 1 system may be subject to regulatory interest and influence and be classed as "fiscal".

By mutual agreement, collection and gathering agreement, allocation agreement or other such commercial contracts, measurement equipment that might be categorised as Class 2 may be used for fiscal or equity purposes such as allocation. The rationale being that by using similar equipment and procedures on similar product, risk is shared in an equitable manner. This is especially true of shared production or pipeline facilities and the subsequent allocation systems. Fluids should be measured



with an uncertainty proportionate to each partner's stake such that the maximum product at risk for any owner is limited to an equitable amount.

3.4. Class 3 measurement systems.

- a. Class 3 measurement systems shall be suitable for general monitoring and control and may be of a lower accuracy standard than Class 2 systems.

Whilst reliability is still a prerequisite for general control and operations measurement equipment, the requirement for accuracy and degree of sophistication can be reduced to a level compatible with the practical needs of the application. For example, calibration checks might not be required on a routine basis but be carried out on suspicion of malfunction or high error.

Further guidance on instrumentation is given in ETP Category 30, Instrumentation & Control documents.

4. General

- a. In accordance with GP 64-00, measurement management systems shall comply with ISO 10012.
- b. Measurement systems shall be fit for purpose.
- c. Measurement systems shall, as a minimum, meet any applicable regulations; provide measurements traceable to recognised metrological primary standards; be compliant with accepted industry standards; and be in accordance with agreed commercial requirements.

Liquid and gas measurement systems must comply with applicable regulations in the country of installation.

- d. The management accountable for the project or operation shall ensure that:
1. Regulatory requirements and interfaces are identified and complied with.
Geographic requirements may dictate that regulatory authorities be consulted at all stages of a measurement project.
 2. The measurement facilities are a properly designed and approved, safely fabricated, installed and operated.
 3. Measurement Philosophy and Strategy is documented and approved, and
 4. Measurement Technical Authority (TA) is designated.
- e. For Class 1 measurement this GP shall be rigorously adhered to.
- f. For Class 2 and Class 3 measurement systems the degree of attention paid to specification, design and operation may be progressively relaxed according to the associated commercial exposure.
- g. Equipment selection, design, maintenance and calibration and operation shall be in accordance with GP 64-02, GP 64-03 and GP 64-04, respectively for dynamic, static and quality measurement systems.
- h. External measurement consulting services may be contracted at various stages of projects and operations.
- i. Consultancy services shall be of high standard and of good reputation and should be approved by the Measurement TA.
- j. Routine reviews and audits of measurement systems and operations by qualified and reputable personnel shall be conducted and documented.

