

Manual of Petroleum Measurement Standards Chapter 13.3

Measurement Uncertainty

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Introduction

This standard serves as a standardized method to determine the uncertainty associated with various aspects of petroleum measurement. This standard supersedes API MPMS Chapter 13.1, *Statistical Concepts and Procedures in Measurement*, which has been withdrawn. Content from the superseded standard has been merged with this document to prevent duplication and promote alignment of content among the Chapter 13 standards.

This method is based on the 2008 edition of the International Organization of Standards (ISO) *Guide to the Expression of Uncertainty in Measurement* (GUM)-JCGM 100:2008-which was developed to be a guide for the writers of technical standards.

Although this document could be used for analysis of an entire system or facility, that use is outside the scope of the document.

The uncertainty estimate is only as good as the underlying data and engineering judgment. All of the numerical values used and assumptions made must be documented. The statement in Section 3.4 of the ISO *GUM* reproduced below applies to this standard:

“Although this guide provides a framework for assessing uncertainty, it cannot substitute for critical thinking, intellectual honesty and professional skill. The evaluation of uncertainty is neither a routine task nor a purely mathematical one; it depends on detailed knowledge of the nature of the measurand and of the measurement. The quality and utility of the uncertainty quoted for the result of a measurement therefore ultimately depend on the understanding, critical analysis and integrity of those who contribute to the assignment of its value.”

Measurement Uncertainty

1 Scope

This standard reviews basic statistical concepts and uses such to establish a methodology to develop uncertainty analyses for use in writing API *Manual of Petroleum Measurement Standards (MPMS)* documents that are consistent with the ISO *GUM* and NIST Technical Note 1297.

2 Normative References

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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