# Manual of Petroleum Measurement Standards Chapter 13.3

## Measurement Uncertainty

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## Foreword

This standard is in response to the call by industry and regulators for a standardized method to determine the uncertainty associated with various aspects of petroleum measurement. 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 this 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."

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Suggested revisions are invited and should be submitted to the Standards Department, API, 1220 L Street, NW, Washington, DC 20005, standards@api.org.

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## 1 Scope

This standard establishes 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.

API *Manual of Petroleum Measurement Standards (MPMS)* Chapter 12, *Calculation of Petroleum Quantities, Section 2—Calculation of Liquid Petroleum Quantities Measured by Turbine or Displacement Meters*, 1981

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API *MPMS* Chapter 22.1, *Testing Protocols—General Guidelines for Developing Testing Protocols for Devices Used in the Measurement of Hydrocarbon Fluids*, 2006, Reaffirmed 2011

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