THE INSTITUTE OF PETROLEUM

PETROLEUM MEASUREMENT MANUAL

GUIDANCE NOTES ON THE APPLICATION AND PERFORMANCE OF SMALL VOLUME PROVERS

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FOREWORD

The Petroleum Measurement Committee of the Institute of Petroleum is responsible for the production and maintenance of standards and guides covering the various aspects of static and dynamic measurement of petroleum. These are issued as separate Parts and Sections of the Institute’s Petroleum Measurement Manual, which was first published in 1952.

Membership of the IP working panels is made up of experts from the oil industry, equipment manufacturers, cargo inspectors and government authorities. Liaison is maintained with parallel working groups of the Committee on Petroleum Measurement of the American Petroleum Institute, and is extended as necessary to embrace other organizations concerned with quantitative measurement in other countries and in other industries.

Users are invited to send comments, suggestions, or details of experience with this issue to:

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The Petroleum Measurement Manual is widely used by the petroleum industry and has received recognition in many countries by consumers and the authorities. In order to promote their wide adoption internationally, it is the policy to submit selected standards through the British Standards Institute to Technical Committee TC 28 - Petroleum Products and Lubricants - of the International Organization for Standardization (ISO/TC 28) as potential International Standards.

A full list of the Parts and Sections of the Petroleum Measurement Manual (PMM) is available on request from the Institute of Petroleum.

Note:

The IP Petroleum Measurement Manual is recommended for general adoption but shall be read and interpreted in conjunction with weights and measures, safety and other regulations in force in the location where it is to be applied. Such regulatory requirements shall have precedence over the corresponding clauses in the Manual except where the requirements of the Manual are more rigorous, when its use is recommended. The Institute disclaims responsibility for any personal injury, or loss or damage to property howsoever caused, arising from the use or abuse of any Part or Section of the Manual.
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INTRODUCTION AND SCOPE

Pipe provers have been used in the oil industry for many years to prove meters to custody transfer and fiscal standards. As a consequence their capabilities and limitations are well understood and numerous standards are available to guide the user or potential user in their application.

During the past twenty years the small volume or compact prover has been developed and promoted as an alternative to the conventional pipe prover. Small volume provers differ significantly in their design from conventional pipe provers. Apart from the fact that the displaced volume for a given flow rate is smaller, these provers incorporate a piston moving in a machined cylinder rather than a sphere displacer in standard pipe. Furthermore small volume provers use precision detectors as opposed to simple mechanical detectors to start and stop the pulse counting process.

Although the refinements in the design of the small volume prover are intended to overcome the limitations imposed by its volume, experience indicates that certain meters do not calibrate well using current small volume provers. Additional and unexpected costs have often been incurred by users in resolving problems associated with the incorrect application of small volume provers, and it is clear that the limitations in their performance and operating conditions need to be clarified.

This Guidance Note addresses these issues, providing advice on the application of small volume provers to proving those types of meter most frequently used in the oil industry. The information is based on flow laboratory test data as well as experience derived in the field, some of it gained on white oil products and some on water.