INSTITUTE OF PETROLEUM

PETROLEUM MEASUREMENT MANUAL

PART XIII
Fidelity and Security of Measurement Data

Section 3

Electrical and/or Electronic Data Capture Systems for Flow Metering

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CAPTURE SYSTEMS FOR
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FOREWORD

Measurement accuracy is essential in the sale, purchase and handling of petroleum products. It avoids disputes between buyer and seller and provides the reliable means of control over losses. Accurate measurement involves the use of standardized equipment and procedures.

The Petroleum Measurement Committee of the Institute of Petroleum is responsible for the production and maintenance of standards covering the various aspects of static and dynamic measurement of petroleum. These standards are issued as separate Parts and Sections of Parts 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 and government authorities. Liaison is maintained where appropriate 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:

The Secretary, Petroleum Measurement Committee,
Institute of Petroleum,
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London W1M 8AR,
United Kingdom.

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 Institution to Technical Committee 28—Petroleum Products and Lubricants—of the International Organization for Standardization (ISO) as potential International Standards.

A full List of Parts and Section of the *Petroleum Measurement Manual* (PMM) is available on request from the Institute of Petroleum.

Note

The IP Petroleum Measurement Standards are recommended for general adoption but they must be read and interpreted in conjunction with weights and measures, safety and other regulations in force in a particular country in which it is intended to apply them. Such regulatory requirements shall have precedence over corresponding clauses in the standards. 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

During the last decade there has been a rapid increase in the use of electrical or electronic data capture systems designed to facilitate the determination of physical quantities such as length, mass, volume, etc.

The application of these technologies and other advanced technologies such as laser and fibre optic transmission of data, has enhanced the control that can be applied to complex measuring systems. Single and multi-component streams can with confidence be managed to indicate volume at standard conditions continuously or intermittently at frequent intervals, in step with integration into the system of variable data such as density, pressure, temperature and the results of in-line proving.

Such systems can be vulnerable to disturbance arising from the environment in which they are used, for example from functional failures and ratio variations in multi-component streams.

The purpose of this Code of Practice is to assist manufacturers and users of complex flow measuring systems designed to convert measured volume to volume at standard conditions or to mass units, to meet certain criteria for the design, installation, operation and maintenance of such systems. The object is to establish and maintain the integrity of the system and the indicated data against influences acting to impair the fidelity of the measured result.

The Code recommends solutions which constitute good practice in this field at this time, but it is not claimed that the recommendations are wholly comprehensive. The recommendations are, however, considered to be Practicable and to satisfy the immediate needs of industries associated with the metering and proving of hydrocarbon fluids in the Bulk Commercial and Royalty Metering, Customs and Excise Revenue Account, and Custody Transfer in general.

It is not intended that the recommendations should inhibit technological progress in the industry and therefore, amendments may be introduced as and when required.

Where other codes or standards are referred to in the text it should be assumed, unless otherwise stated, that the latest editions are referred to. For convenience the latest editions (at the time of publication of this Code) are listed in Appendix B.

The following forms of measurement are covered in this Code.

(a) *Line Volume*—The volume recorded for a fluid flow that has passed through a metering system without correction other than for the meter factor.

(b) *Standard Volume*—The line volume corrected to standard temperature and pressure.

(c) *Mass*—The mass recorded for a fluid flow that has passed through a metering system. This is derived from measurements of line volume and density.