INSTITUTE OF PETROLEUM

PETROLEUM MEASUREMENT MANUAL

PART X
Meter Proving

SECTION 8

GUIDANCE FOR CALIBRATION OF ADDITIVE INJECTION SYSTEMS ON ROAD LOADING GANTRIES

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FOREWORD

Measurement accuracy is essential for the sale, purchase and handling of petroleum products. It reduces the likelihood of disputes between buyer and seller and facilitates the control of losses. Accurate measurement demands the use of calibration equipment with accuracy traceable to national or international standards and the adoption of standard procedures.

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 at the particular 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.

ACKNOWLEDGEMENTS

This Part of the Petroleum Measurement Manual was prepared by a Working Group drawn from the Commercial Metering Committee, PM-D-4, which is part of the Institute's Petroleum Measurement Committee structure.

Members of the Working Group associated with production of the standard were:-

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M V Nott	BP Oil UK Ltd
F Peck	Mobil Oil Company Ltd
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J D Snook	Consultant
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Company affiliations are those that applied at the time the document was being drafted.

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INTRODUCTION AND SCOPE

In recent years there has been a marked increase in requirements to inject performance-enhancing additives into automotive fuels at road loading gantries. In addition, the development of terminal sharing arrangements has resulted in many loading gantries having to cater for more than one marketing operator. These factors in combination have led to the installation of multiple additive injection systems at many terminals.

Additive injection systems require segregated storage, pumped feed systems, metering equipment and line injection facilities for each type of additive and each company fuel specification. A demand for accurate reconciliation and stock control has thereby emerged. Earlier system designs comprised meter-driven, mechanical injector pumps for dedicated additives. The equipment was checked as part of the meter proving operation. However, such designs have been superseded by stand-alone additive systems that require calibration and maintenance in their own right.

These developments have led to a need for industry guidelines for the operation, maintenance and calibration of additive systems. This document addresses that need. Since each additive injection system is principally directed at a single company's own-brand products, the scope of the guidelines does not fall within the normal parameters of a Code of Practice for industry.

The document is therefore issued as Guidance and covers pulse-operated shuttle and metered-shot injection systems used for the injection of proprietary additives into automotive and other white oil fuels at loading gantries.

Various designs of pulse-operated additive injection systems and their operation are described. Minimum calibration volumes and tolerances for injection systems are recommended. The Guidance provides detailed procedures for testing the integrity of additive injectors and for calibrating different types of injector and additive in-line flowmeters, using various calibration techniques.

It is recommended that the Guidance is read in conjunction with IP Petroleum Measurement Manual Part X, Sections 2 and 5, dealing with the proving of gantry meters, since calibration and maintenance of injector systems will normally be carried out in conjunction with meter proving.

Compliance with this guidance will help ensure that additive injection systems deliver the dose levels specified by fuel formulations and that accurate information is generated for additive stock control purposes.