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ISO 7278-2:1988

Australian Standard®

Liquid hydrocarbons—Dynamic measurement—Proving systems for volumetric meters

Part 2: Pipe provers

This Australian Standard was prepared by Committee ME/49, Oil and Gas Measurement. It was approved on behalf of the Council of Standards Australia on 15 August 1994 and published on 5 January 1995.

The following interests are represented on Committee ME/49:

Australian Customs Service

Australian Gas Association

Australian Institute of Physics

Australian Liquefied Petroleum Gas Association

Australian Petroleum Exploration Association

CSIRO, Division of Applied Physics

Department of Primary Industries and Energy

Institute of Instrumentation and Control, Australia

Institution of Engineers Australia

National Association of Testing Authorities

National Standards Commission

Pipeline Authority

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PREFACE

This Standard was prepared by the Standards Australia Committee on Oil and Gas Measurement and is designated Part 2 of a series of Standards dealing with petroleum liquid measurement systems under the general title *Liquid hydrocarbons—Dynamic measurement—Proving systems for volumetric meters*. Part 2 covers *Pipe provers*.

Other Standards or proposed Standards in this series are as follows:

Part 1: General principles
Part 3: Pulse interpolation
Part 4: Temperature corrections in volumetric calibration by water transfer method
Part 5: Dynamic measurement

The Standard is identical with and has been reproduced from ISO 7278.2, *Liquid hydrocarbons—Dynamic measurement—Proving systems for volumetric meters*, Part 2: *Pipe provers*.

For the purpose of this Australian Standard, the ISO text should be modified by replacing any references to 'International Standard' with 'Australian Standard'.

Reference to International Standard		*Australian Standard*	
ISO		AS	
2715	Liquid hydrocarbons—Volumetric measurement by turbine meter systems	2651	Liquid hydrocarbons—Volumetric measurement by turbine meter systems
4267	Petroleum and liquid petroleum products—Calculation of oil quantities	4250	Liquid hydrocarbons—Dynamic measurement—Proving systems for volumetric meters
4267.2	Part 2: Dynamic measurement	4250.5	Part 5: Dynamic measurement
5024	Petroleum liquids and gases—Measurement—Standard reference conditions	2649	Petroleum liquids and gases—Measurement—Standard reference conditions
7278	Liquid hydrocarbons—Dynamic measurement—Proving systems for volumetric meters	4250	Liquid hydrocarbons—Dynamic measurement—Proving systems for volumetric meters
7278.3	Part 3: Pulse interpolation techniques	4250.3	Part 3: Pulse interpolation techniques
8222	Petroleum measurement systems—Calibration—Temperature corrections for use with volumetric reference measuring systems	—	

Whilst there is no exact Australian equivalent to ISO 8222, users of this Standard should be aware that AS 4250.4, *Temperature corrections in volumetric calibration by water transfer method* effectively replaces ISO 8222 for Australian conditions.

Under arrangements made between Standards Australia and the International Standards bodies, ISO and IEC, as well as certain other Standards organizations, users of this Australian Standard are advised that the number of this Standard is not reproduced on each page; its identity is shown only on the cover and title pages.

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AUSTRALIAN STANDARD

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Part 2:
Pipe provers

0 Introduction

Pipe provers are used as volume standards for the calibration of liquid meters. The purpose of this part of ISO 7278 is to outline the essential elements of a pipe prover, to provide specifications for its performance, and to give guidance on its design, installation and calibration. Pipe provers discussed in this part of ISO 7278 are of the running-start/running-stop type, in which flow is uninterrupted during proving, thus permitting the meter to be proved under its normal operating conditions. This type of prover includes a calibrated section of pipe in which a displacer travels, actuating detection devices which produce electrical signals as the displacer passes each end of the calibrated portion. The displacer finally stops at the end of the run as it enters a region where the flow bypasses it.

Both stationary and mobile provers may be constructed on this principle. The calibrated section of the prover may be straight or folded (U-shaped), and the design may be such that the displacer moves around a closed loop in only one direction unidirectional) or, alternatively, in both directions bidirectional).

ISO 7278 consists of the following parts, under the general title *Liquid hydrocarbons — Dynamic measurement — Proving systems for volumetric meters:*

— *Part 1: General principles*

— *Part 2: Pipe provers*

— *Part 3: Pulse interpolation techniques*

Annex A forms an integral part of this part of ISO 7278. Annex B is for information only.

1 Scope and field of application

1.1 This part of ISO 7278 provides guidance for the design, installation and calibration of pipe provers. Calculation techniques for use when calibrating and operating provers are detailed in ISO 4267-2.

1.2 Most of the material in this part of ISO 7278 is general in that it applies to pipe provers for use with different liquids and types of meters and for proving them in different services. This part of ISO 7278 does not apply to the newer “small volume” or “compact” provers.

1.3 The standard reference conditions for petroleum measurement are a temperature of 15°C and a pressure of 101 325 Pa as specified in ISO 5024.

NOTE — In some countries other reference temperatures are used, e.g. 20°C and 60°F.

2 References

ISO 2715, *Liquid hydrocarbons — Volumetric measurement by turbine meter systems.*

ISO 4267-2, *Petroleum and liquid petroleum products — Calculation of oil quantities — Part 2: Dynamic measurement.*[1)]

ISO 5024, *Petroleum liquids and gases — Measurement — Standard reference conditions.*

ISO 7278-3, *Liquid hydrocarbons — Dynamic measurement — Proving systems for volumetric meters — Part 3: Pulse interpolation techniques.*

ISO 8222, *Petroleum measurement systems — Calibration — Temperature corrections for use with volumetric reference measuring systems.*

3 Definitions

For the purposes of this part of ISO 7278, the following definitions apply:

3.1 base volume: The volume of a prover calibrated section, i.e. the length between the detectors, at specified reference conditions of temperature and pressure.

1) At present at the stage of draft.