

Australian Standard™

**Rotodynamic pumps—Hydraulic
performance acceptance tests—
Grades 1 and 2**



S t a n d a r d s Australia

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Australian Pump Manufacturers
South Australian Water Corporation
Sydney Water Corporation

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PREFACE

This Standard was prepared by the Standards Australia Committee ME-030, Pumps to supersede AS 2417—1980, Parts 1, 2 and 3.

This Standard is identical with and has been reproduced from ISO 9906:1999(E), *Rotodynamic pumps—Hydraulic performance acceptance tests—Grades 1 and 2*.

Statements expressed in mandatory terms in notes to text, tables and figures are deemed to be requirements of this Standard.

As this Standard is reproduced from an international Standard the following applies:

- (a) Its number appears on the cover and title page while the International Standard number appears only on the cover.
- (b) In the source text, ‘this International Standard’ should read ‘this Australian Standard’.
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References to international Standards should be replaced by reference to identical Australian Standards, as follows:

| <i>Reference to International Standard or other publication</i> | | <i>Australian/New Zealand Standard</i> | |
|---|--|--|--|
| ISO | | AS | |
| 1438 | Water flow measurement in open channels using weirs and Venturi flumes | 3778 | Measurement of water flow in open channels |
| 1438-1 | Part 1: Thin-plate weirs | 3778.4.1 | Part 4.1: Measurement using flow gauging structures—Thin plate weirs |
| 2186 | Fluid flow in closed conduits—Connections for pressure signal transmissions between primary and secondary elements | | — |
| 3354 | Measurement of clean water flow in closed conduits—Velocity-area method using, current-meters in full conduits and under regular flow conditions | | — |
| 3966 | Measurement of fluid flow in closed conduits—Velocity area method using Pitot static tubes | | — |
| 4373 | Measurement of fluid flow in open channels—Water-level measuring devices | 3778.6.5 | Part 6.5: Measuring devices, instruments and equipment—Water-level measuring devices |
| 5167 | Measurement of fluid flow by means of pressure differential devices | 2360 | Measurement of fluid flow in closed conduits |
| 5167-1 | Part 1: Orifice plates, nozzles and Venturi tubes inserted in circular cross-section conduits running full | 2360.1.1 | Part 1.1: Pressure differential methods—Measuring using orifice plates, nozzles or Venturi tubes—Conduits with diameters from 50 mm to 1200 mm |

| ISO | | AS | |
|---------|--|----------|--|
| 8316 | Method by collection of liquid in a volumetric tank—Method by collection of a liquid in a volumetric tank | 2360.6.2 | Part 6.2: Volumetric methods—By volume |
| 5198 | Centrifugal, mixed flow and axial pumps—Code for hydraulic performance tests—Precision grade | | — |
| 7194 | Measurement of fluid flow in closed conduits—Velocity-area methods of flow measurement in swirling or asymmetric flow conditions in circular ducts by means of current-meter or Pitot-static tubes | | — |
| 9104 | Measurement of liquid flow in closed conduits—Methods of evaluating the performance of electro-magnetic flow-meters for liquids | | — |
| IEC | | | |
| 60034 | Recommendations for rotating electrical machinery (excluding machines for traction vehicles)— | | — |
| 60034-2 | Part 2: Determination of efficiency of rotating electrical machinery | | — |
| 60051 | Recommendations for direct acting electrical measuring instruments and their accessories | | — |

The term 'informative' has been used in this Standard to define the application of the annex or appendix to which it applies. An 'informative' annex or appendix is only for information and guidance.

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INTRODUCTION

This International Standard combines and replaces the former acceptance test standards ISO 3555:1977 (corresponding to grade 1 of this International Standard) and ISO 2548:1975 (corresponding to grade 2 of this International Standard), but there is an important change in the verification of guarantees, because the uncertainty of measurement must not influence the acceptability of a pump and the tolerances are due to constructional differences only.

New tolerance factors have been introduced to ensure as far as possible that a pump which was acceptable under the previous International Standards (ISO 2548 and/or ISO 3555) would also be acceptable under this International Standard.

Contrary to this International Standard, ISO 5198 is not to be understood as an acceptance test code. It gives guidance for measurements of very high accuracy and for the thermodynamic method for direct measurement of efficiencies, but it does not recommend verification of guarantees.

Terms used in this International Standard such as "guarantee" or "acceptance" should be understood in a technical but not in a legal sense. The term "guarantee" therefore specifies values for checking purposes determined in the contract, but does not say anything about the rights or duties arising, if these values are not reached or fulfilled. The term "acceptance" does not have any legal meaning here, either. Therefore, an acceptance test carried out successfully alone does not represent an "acceptance" in the legal sense.

AUSTRALIAN STANDARD

Rotodynamic pumps—Hydraulic performance acceptance tests— Grades 1 and 2

1 Scope

This International Standard specifies hydraulic performance tests for acceptance of rotodynamic pumps (centrifugal, mixed flow and axial pumps, hereinafter simply designated as “pumps”). It is applicable to pumps of any size and to any pumped liquids behaving as clean cold water (such as defined in 5.4.5.2). It is neither concerned with the structural details of the pump nor with the mechanical properties of their components.

This International Standard contains two grades of accuracy of measurement: grade 1 for higher accuracy, and grade 2 for lower accuracy. These grades include different values for tolerance factors, for allowable fluctuations and uncertainties of measurement.

For pumps produced in series with selection made from typical performance curves and for pumps with power input of less than 10 kW, see annex A for higher tolerance factors.

This International Standard is applicable both to a pump itself without any fittings and to a combination of a pump associated with all or part of its upstream and/or downstream fittings.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 1438-1, *Water flow measurement in open channels using weirs and Venturi flumes — Part 1: Thin-plate weirs.*

ISO 2186, *Fluid flow in closed conduits — Connections for pressure signal transmissions between primary and secondary elements.*

ISO 3354, *Measurement of clean water flow in closed conduits — Velocity-area method using, current-meters in full conduits and under regular flow conditions.*

ISO 3966, *Measurement of fluid flow in closed conduits — Velocity area method using Pitot static tubes.*

ISO 4373, *Measurement of liquid flow in open channels — Water-level measuring devices.*

ISO 5167-1, *Measurement of fluid flow by means of pressure differential devices — Part 1: Orifice plates, nozzles and Venturi tubes inserted in circular cross-section conduits running full.*

ISO 5198, *Centrifugal, mixed flow and axial pumps — Code for hydraulic performance tests — Precision grade.*

ISO 7194, *Measurement of fluid flow in closed conduits — Velocity-area methods of flow measurement in swirling or asymmetric flow conditions in circular ducts by means of current-meters or Pitot-static tubes.*

ISO 8316, *Measurement of liquid flow in closed conduits — Method by collection of the liquid in a volumetric tank.*

ISO 9104, *Measurement of liquid flow in closed conduits — Methods of evaluating the performance of electro-magnetic flow-meters for liquids.*