



American National Standard for

Rotodynamic Pumps

— for Installation, Operation, and Maintenance



ANSI/HI 14.4–2018

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Rotodynamic Pumps
— for Installation, Operation, and Maintenance

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American National Standard

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Foreword (Not part of Standard)

Purpose and aims of the Hydraulic Institute

The purpose and aims of the Hydraulic Institute (HI) are to promote the advancement of the pump manufacturing industry and further the interests of the public and to this end, among other things:

- a) Develop and publish standards
- b) Address pump systems
- c) Expand knowledge and resources
- d) Educate the marketplace
- e) Advocate for the industry.

Purpose of Standards and Guidelines

- a) HI Standards and Guidelines are adopted in the public interest and are designed to help eliminate misunderstandings between the manufacturer, the purchaser, and/or the user and to assist the purchaser in selecting and obtaining the proper product for a particular need.
- b) Use of HI Standards and Guidelines is completely voluntary. Existence of HI Standards does not in any respect preclude a member from manufacturing or selling products not conforming to the standards.

Definition of a Standard of the Hydraulic Institute

Quoting from Article XV, Standards, of the By-Laws of the Institute, Section B:

“An Institute Standard defines the product, material, process or procedure with reference to one or more of the following: nomenclature, composition, construction, dimensions, tolerances, safety, operating characteristics, performance, quality, rating, testing and service for which designed.”

Definition of a Hydraulic Institute Guideline

An HI Guideline is not normative. The guideline is tutorial in nature to help the reader better understand the subject matter.

Comments from users

Comments from users of this standard will be appreciated, to help HI prepare even more useful future editions. Questions arising from the content of this standard may be directed to the HI Technical Director. If appropriate, the inquiry will then be directed to the appropriate technical committee for provision of a suitable answer.

Revisions

American National Standards of the Hydraulic Institute (ANSI/HI) are subject to constant review, and revisions are undertaken whenever it is found necessary because of new developments and progress in the art. If no revisions are made for five years, the standards are reaffirmed using the ANSI canvass procedure.

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This document was prepared by an HI committee and approved by following ANSI essential requirements. Neither HI, HI committees, nor any person acting on behalf of HI: 1) makes any warranty, expressed or implied, with respect to the use of any information, apparatus, method, or process disclosed in this document or guarantees that such may not infringe privately owned rights; 2) assumes any liabilities with respect to the use of, or for damages resulting from the use of, any information, apparatus, method, or process disclosed in this guideline. The Hydraulic

Institute is in no way responsible for any consequences to an owner, operator, user, or anyone else resulting from reference to the content of this document, its application, or use.

This document does not contain a complete statement of all requirements, analyses, and procedures necessary to ensure safe or appropriate selection, installation, testing, inspection, and operation of any pump or associated products. Each application, service, and selection is unique with process requirements that shall be determined by the owner, operator, or its designated representative.

Units of measurement

Metric units of measurement are used, and corresponding US customary units appear in parentheses. Charts, graphs, and sample calculations are also shown in both metric and US customary units. Because values given in metric units are not exact equivalents to values given in US customary units, it is important that the selected units of measure to be applied be stated in reference to this standard. If no such statement is provided, metric units shall govern.

Consensus

Consensus for this American National Standard was achieved by use of the canvass method. The following organizations, recognized as having an interest in the standardization of pumps, were contacted prior to the approval of this revision of the standard. Inclusion in this list does not necessarily imply that the organization concurred with the submittal of the proposed standard to ANSI.

Arizona Public Service/PVGS
Brown and Caldwell
Carollo Engineers Inc.
David McKinstry, Retired
GM BluePlan Engineering
JK Muir LLC
Kemet Inc.
Mechanical Solutions, Inc.
Outotec Canada Ltd.
Swiss Flow Solutions

Committee list

Although this standard was processed and approved for submittal to ANSI by the canvass method, a working committee met many times to facilitate its development. At the time it was developed, the committee had the following members:

Chair – Paul Ruzicka, Xylem – Applied Water Systems
Vice Chair – Ernest Sturtz, CDM Smith – Water Services Group

Committee Members

Lloyd Aanonsen
Jack Bagain
Michael Coussens
Ryan Grimm (Alternate)
Patrick Hogg
Lane Larsen
Patricia McCarthy
Michael Mueller (Alternate)
Maya Place (Alternate)
Craig Redmond
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Kees van der Sluijs
Jared Wageman
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Company

General Rubber Corporation
John Crane Inc.
Peerless Pump Company
Sundyne LLC
Nidec Motor Corporation
Weir Specialty Pumps
Xylem Inc. - Water Solutions
Flowserve Corporation
SULZER
Gorman-Rupp, Mansfield Division
Xylem Inc. - Water Solutions
MWH Americas, Inc.
National Pump Company
Flowserve Corporation
Sundyne LLC
SULZER

14.4 Manuals describing installation, operation, and maintenance

14.4.1 Introduction

ANSI/HI Standards for Rotodynamic Installation, Operation, and Maintenance (IOM) have historically been subdivided into ANSI/HI 1.4 *Rotodynamic Centrifugal Pumps for Manuals Describing Installation, Operation, and Maintenance* and ANSI/HI 2.4 for *Rotodynamic Vertical Pumps for Manuals Describing Installation, Operation, and Maintenance*. The demarcation between these two standards was determined by the arrangement of the hydraulic configuration (impeller, casing, bowl, or diffuser).

However, in each case they have shared a standard outline with similar content that is better addressed collectively rather than separately. Every effort has been made to include and expand all the information contained in these previous standards into a single resource. **This document establishes a single source for a standard outline for IOM manuals for the pump community.**

The normative portion of this standard is prescriptive in nature and thereby mandatory for compliance to this standard; it provides a standard outline for manufacturer's IOM manuals.

Appendix A, a collection of IOM reference information arranged per the new standard outline, is informative and not mandatory for compliance to this standard. Pump users should refer to the manufacturer's IOM manuals for IOM information specific to their equipment.

14.4.1.1 Purpose

The purpose of this standard is provide a normative outline for pump manufacturer's IOM manuals and reference materials to serve as a manufacturer's guideline for the development of an IOM manual that complies with the requirements of the standard.

14.4.1.2 Scope

This standard applies to IOM manuals for all rotodynamic pumps. For additional instructions on sealless rotodynamic pumps, see ANSI/HI 5.1-5.6 *Sealless Rotodynamic Pumps for Nomenclature, Definitions, Application, Operation, and Test*. For additional information on rotodynamic pumps types, see ANSI/HI 14.1-14.2 *Rotodynamic Pump for Nomenclature and Definitions*.

14.4.1.3 Units, Symbols, and Subscripts

The normative portion of this standard is related to to the outline of the IOM only; therefore, this section is left blank.

14.4.2 Standard outline for IOM manuals

The standard outline shall be used when writing IOM manuals. The subtopics that appear under each section may be combined and/or arranged to meet the specific needs of the product being addressed. Not all of the subtopics listed need to be included in the IOM manual for all products; the manufacturer will be given the latitude to decide if a particular subtopic is applicable. If the manufacturer has elected not to include a specific section they should include the section in their document and table of contents but identify it as not applicable. Additional content may be added after Section A.9.

For example, in Section A.1, the explanation of safety designations should precede specific safety warnings for a product.

A.1 Introduction and Safety

- Marking and approvals (UL, CSA, NSF, CE, ATEX, etc.)
- Safety