Approved American National Standard

ANSI

American National Standard for

Rotodynamic Centrifugal Pumps

for Nomenclature and Definitions

ANSI/HI 1.1–1.2-2014

Hydraulic Institute

6 Campus Drive
First Floor North
Parsippany, New Jersey
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www.Pumps.org

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Sponsor

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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 Institute are to promote the continued growth and well-being of pump users and manufacturers and further the interests of the public in such matters as are involved in manufacturing, engineering, distribution, safety, transportation and other problems of the industry, and to this end, among other things:

a) To develop and publish standards for pumps;

b) To collect and disseminate information of value to its members and to the public;

c) To appear for its members before governmental departments and agencies and other bodies in regard to matters affecting the industry;

d) To increase the amount and to improve the quality of pump service to the public;

e) To support educational and research activities;

f) To promote the business interests of its members but not to engage in business of the kind ordinarily carried on for profit or to perform particular services for its members or individual persons as distinguished from activities to improve the business conditions and lawful interests of all of its members.

Purpose of Standards

1) Hydraulic Institute Standards 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.

2) Use of Hydraulic Institute Standards is completely voluntary. Existence of Hydraulic Institute 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.”

Comments from users

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

If a dispute arises regarding contents of an Institute standard or an answer provided by the Institute to a question such as indicated above, the point in question shall be sent in writing to the Technical Director of the Hydraulic Institute, who shall initiate the appeals process.

Revisions

The Standards of the Hydraulic Institute 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 in accordance with the *ANSI Essential Requirements*.

Units of measurement

Metric units of measurement are used, and corresponding US customary units appear in brackets. 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 for this standard was achieved by use of the canvass method

The following organizations, recognized as having an interest in the standardization of centrifugal 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.

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:

Co-Chair – Michael L. Mueller, Flowserve Corporation
Co-Chair – Bruce Ticknor, III, National Pump Company

Committee Members	**Company**
Michael Coussens	Peerless Pump Company
Michael S. Cropper	Sulzer Pumps (US) Inc.
Lucian Dobrot	TACO, Inc.
Al Iseppon	Pentair - Berkeley
Christopher P. Rackham	John Crane Inc.
Aleksander S.Roudnev	Weir Minerals North America
Joseph M. Salah	Sulzer Pumps Solutions Inc.

Alternates	**Company**
Christopher S. Johnson, Xylem Inc.	Applied Water Systems

Preface

This document has been created to provide a standard for nomenclature and definitions for centrifugal pumps for various pumps configurations and services.

Symbols are used throughout this standard to identify the pump types. When originally introduced, the convention is to define the term in text, followed by the HI symbol in parenthesis (xx) and, when different, the ISO symbol is in brackets [xx].

Standard ANSI/HI 1.3 *Rotodynamic Centrifugal Pumps for Design and Applications* complements the nomenclature and definitions content in this document with detailed information about the design and application of rotodynamic centrifugal pumps.

1 Rotodynamic centrifugal pumps

1.1 Types and nomenclature

Rotodynamic pumps may be classified by such methods as impeller or casing configuration, end application of the pump, specific speed, or mechanical configuration. The method used in Figure 1.1.3a is based primarily on mechanical configuration.

1.1.1 Scope

This standard covers rotodynamic pumps with centrifugal (radial), mixed flow, and axial flow impellers, as well as regenerative turbine and Pitot tube type pumps, of all industrial/commercial types except vertically suspended diffuser turbine pumps. It contains description of types, nomenclature, and definitions.

1.1.2 Definition of rotodynamic centrifugal pumps

Rotodynamic pumps are kinetic machines in which energy is continuously imparted to the pumped fluid by means of a rotating impeller, propeller, or rotor. The most common types of rotodynamic pumps are centrifugal (radial), mixed flow, and axial flow pumps.

Centrifugal pumps use bladed impellers with essentially radial outlet to transfer rotational mechanical energy to the fluid primarily by increasing the fluid kinetic energy (angular momentum). Kinetic energy is then converted into pressure energy in the discharge collector.

1.1.3 Types of rotodynamic pumps

Rotodynamic pumps are commonly typed by their general mechanical configuration (see Figures 1.1.3a, b, c, d, and e). The broadest characteristics are discussed in the following paragraphs:

1.1.3.1 Overhung impeller type (OH)

In this group, the impeller(s) is mounted on the end of a shaft that is cantilevered or “overhung” from its bearing supports.

These pumps are either close coupled, where the impeller is mounted directly on the driver shaft; or separately coupled, where the impeller is mounted on a separate pump shaft supported by its own bearings. See Table 1.1.3.1 for a listing of OH pump types and their attributes.

1.1.3.1.1 Close coupled (OH5, OH5A, OH6, OH7, OH8A, OH8B, OH9, and OH10)

Close-coupled pumps are commonly characterized by the following attributes:

The pump and driver share one common shaft; the driver bearings absorb all pump thrust loads (axial and radial). The driver is aligned and assembled directly to the pump unit with machined fits.