ANSI/HI 3.6-2022

American National Standard for

Rotary Pump Tests

HYDRAULIC INSTITUTE™

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Rotary Pump Tests

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American National Standard

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Foreword [Not part of American National Standard (ANSI)]

Purpose and aims of the Hydraulic Institute

The purpose and aims of the Hydraulic Institute are to drive all Pump System stakeholders towards a sustainable future by:

a) Advancing Solutions for Pump System Performance and Efficiency

b) Developing Standards and Technical Resources

c) Educating the Global Marketplace

d) Advocating for the Industry

Purpose of Document:

Hydraulic Institute Standards and Guidelines may be published as American National Standards, and are adopted in the public interest 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. Use is completely voluntary and does not in any respect preclude a member from manufacturing or selling products which are not conforming.

Definition of Hydraulic Institute Standard

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 Hydraulic Institute Guideline

A Hydraulic Institute 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 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. 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 are subject to constant review, and revisions are undertaken whenever it is found necessary because of new developments and progress in the art. Errata or addenda may be issued to address limited changes. If no revisions are made for five years, the standards are reaffirmed using the ANSI canvass procedure.

Disclaimer

This document was prepared by a committee of the Hydraulic Institute and approved by following ANSI essential requirements. Neither the Hydraulic Institute, Hydraulic Institute committees, nor any person acting on behalf of the Hydraulic Institute: 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.

Universidad Pontificia Bolivariana
Ekwestrel LLC
Westinghouse Electric Co.
Servicios Procure SPA
Leistritz
Summit Pump Inc
Pentair
HRSD
Lincus, Incorporated

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 – Randy Bennett, Leistritz Advanced Technologies Corp.
Vice-chair – Jeff Sietsema, Blackmer, Inc.

Committee members	**Company**
Kelly Barnes	Boerger LLC
Michael Mueller	Flowserve Corporation
Eric Eylat (Alternate)	Flowserve Corporation
Scott Wild (Alternate)	Leistritz Advanced Technologies Corp.

3.6 Rotary pump tests

This standard recognizes various performance test levels designed to permit a reasonable selection of tests, tolerances, and accuracy requirements appropriate for the application and the customer's needs.

Tests of rotary pumps that conform to the requirements of this standard shall be designated as tests conducted in accordance with the Hydraulic Institute Test Standards. Types of performance tests are defined in Section 3.6.2.

These standards apply to rotary pump tests only, unless stated otherwise. Recorded data and the final report may include information on drives and auxiliary equipment, and must be identified as such.

The type of test performed and the auxiliary equipment to be used (purchaser's driver, gearbox, etc.) should be agreed on in writing by all interested parties before the test.

It is the intent of this standard to offer testing procedures to be used by all testing facilities. It is not the intent to limit or restrict tests to only those described herein. Variations in test procedures may exist without violating the intent of this standard. Exceptions may be taken to the provisions of this standard if properly agreed on by the parties involved without sacrificing the validity of the applicable parts of the standard.

Because pumps are used to handle different liquids or liquid/solid mixtures, it is necessary to limit this standard to the testing of pumps with readily available test liquids. For other than normal test liquids, some methods and procedures not outlined herein may be required.

The objective of the standard is to establish a uniform method for determining a pump's ability to perform satisfactorily both mechanically and hydraulically. The quantitative values observed and recorded will depend on the type of test specified. The quantitative indices are the same for a particular type of test no matter what type of pump is specified.

3.6.1 Scope

This standard recognizes four types of performance tests for rotary pumps and provides procedures for conducting and reporting test data. The test levels have been designed to permit selection of tolerances and accuracy appropriate for the application and the customer's needs. It does not include vibration or acoustical testing.

3.6.2 Type of performance test

The test types below apply to tests on liquids.

I	II	III	IV
Internal quality-assurance test	Speed Pressure	Speed Pressure Rate of Flow	Speed Pressure Rate of Flow Power

Type III and IV tests have two levels of acceptance grades for the quantitative values and reporting requirements, Level A and Level B. Level A is suitable for most industrial and municipal applications and is the default for this standard. If the purchaser specifies that the pump service is critical (such as in power generation, upstream oil & gas, chemical and medical applications, etc.) and requires tighter testing tolerances or requires additional reporting beyond what is specified in Section 3.6.4.11.1, then level B can be requested. The requirement for Level B must be specified by the purchaser and agreed to by the manufacturer prior to manufacturing.

Optional tests: Hydrostatic test and net positive inlet pressure required test are separate tests and are described in Sections 3.6.5 and 3.6.6.