



American National Standard for

Air-Operated Pumps

for Nomenclature, Definitions, Application, and Operation



6 Campus Drive First Floor North Parsippany, New Jersey 07054-4406 www.Pumps.org This is a preview of "ANSI/HI 10.1-10.5-20...". Click here to purchase the full version from the ANSI store.

This page intentionally blank.

ANSI/HI 10.1-10.5-2016

American National Standard for

Air-Operated Pumps

for Nomenclature, Definitions, Application, and Operation

Sponsor

Hydraulic Institute, Inc.

www.Pumps.org

Approved January 8, 2016

American National Standards Institute, Inc.

American National Standard

Approval of an American National Standard requires verification by ANSI that the requirements for due process, consensus and other criteria for approval have been met by the standards developer.

Consensus is established when, in the judgement of the ANSI Board of Standards Review, substantial agreement has been reached by directly and materially affected interests. Substantial agreement means much more than a simple majority, but not necessarily unanimity. Consensus requires that all views and objections be considered, and that a concerted effort be made toward their resolution.

The use of American National Standards is completely voluntary; their existence does not in any respect preclude anyone, whether he has approved the standards or not, from manufacturing, marketing, purchasing, or using products, processes, or procedures not conforming to the standards.

The American National Standards Institute does not develop standards and will in no circumstances give an interpretation of any American National Standard. Moreover, no person shall have the right or authority to issue an interpretation of an American National Standard in the name of the American National Standards Institute. Requests for interpretations should be addressed to the secretariat or sponsor whose name appears on the title page of this standard.

CAUTION NOTICE: This American National Standard may be revised or withdrawn at any time. The procedures of the American National Standards Institute require that action be taken periodically to reaffirm, revise, or withdraw this standard. Purchasers of American National Standards may receive current information on all standards by calling or writing the American National Standards Institute.

Published By

Hydraulic Institute, Inc. 6 Campus Drive, First Floor North Parsippany, NJ 07054-4406 www.Pumps.org

Copyright © 2016 Hydraulic Institute All rights reserved.

No part of this publication may be reproduced in any form, in an electronic retrieval system or otherwise, without prior written permission of the publisher.

Printed in the United States of America

ISBN 978-1-935762-39-3



Contents

		Page
Foreword		v
10	Air-operated pumps	1
10.1	Types and nomenclature	1
10.1.1	Types of air-operated pumps	1
10.1.2	Configuration of pumping devices	2
10.1.3	Nomenclature	2
10.2	Definitions	4
10.2.1	Rate of flow	4
10.2.2	Pressures	6
10.2.3	Suction conditions	7
10.2.4	Air consumption	10
10.2.5	Temperatures	10
10.2.6	Compressed-air properties	10
10.2.7	Liquid properties	11
10.3	Design and application	11
10.3.1	Typical services	11
10.3.2	Diaphragm and bellows type pumps – design and operating features	12
10.3.3	Rate of flow	13
10.3.4	Accuracy	13
10.3.5	Pump controls	13
10.3.6	Wetted parts selection	13
10.3.7	Effect of viscosity and specific gravity on pump performance	14
10.4	Installation, operation, and maintenance	14
10.4.1	Installation	14
10.4.2	Operation	17
10.4.3	Safety	19
10.4.4	Maintenance	20
Appendix /	A Index	23
Figures		
10.1.1 — 7	Types of air-operated pumps	1
10.1.1.1 —	Air-operated double diaphragm pump configuration	1
10.1.1.2 —	Air-operated bellows pump configuration	2
10.1.3.3.2	— Diaphragm with integral outer piston plate	3
10.1.3.6 —	– Types of check valves	4
10.2.1.6 —	– Effective diaphragm area	4
10.4.1 — 5	Suggested installation	16

This is a preview of "ANSI/HI 10.1-10.5-20...". Click here to purchase the full version from the ANSI store.

10.4.1.3a — Flooded suction installation	16
10.4.1.3b — Suction lift installation	16
10.4.1.6 — Suggested submerged installation	17
10.4.2.1 — Duplex pump operation	18
Tables	
10.2a — Symbols	. 5
10.2b — Subscripts	. 6
10.4.4.2a — Diaphragm pump malfunctions – cause and remedy	21
10.4.4.2b — Bellows pump malfunctions – cause and remedy	22

Foreword (Not part of Standard)

Purpose and aims of the Hydraulic Institute

The purpose and aims of the Hydraulic Institute 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) Hydraulic Institute 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 Hydraulic Institute Standards and Guidelines 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."

Definition of a 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. 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