ANSI/HI 10.1-10.5-2021

American National Standard for

Air-Operated Pumps

for Nomenclature, Definitions, Application and Operation

HYDRAULIC INSTITUTE™

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Air-Operated Pumps

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Sponsor
Hydraulic Institute, Inc.
www.Pumps.org

Approved July 19, 2021
American National Standards Institute, Inc.

American National Standard

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Published By

Hydraulic Institute, Inc.
300 Interpace Parkway
Building A, 3rd Floor
Parsippany, NJ 07054-4406

www.Pumps.org

Printed in the United States of America

ISBN 978-1-935762-98-0

Recycled paper

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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

A 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 are 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 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 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.

Disclaimer

This document was prepared by an HI committee and approved by following ANSI essential requirements. Neither the HI, HI committees, nor any person acting on behalf of the 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 HI 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 appear 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.

Brown and Caldwell
Peerless Pump Company
Pentair
SUMMIT PUMP INC
Kenneth Burkhardt
The Chemours Company

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 – Rex Beach, PSG, a Dover Company
Vice-chair – Audrey Mills, ARO Fluid Products

Committee members	Company
John Armitage	Price Pump Company
Chris Distaso	PSG, a Dover Company
Greg Duncan	Blacoh Fluid Control, Inc.
Dennis Hall	Warren Rupp, Inc.
Luis Ornelas	Blacoh Fluid Control, Inc.

10 Air-operated pumps

10.0 Introduction

10.0.1 Purpose

The purpose of this standard is to define common terminology, provide education, and prevent misunderstandings between manufacturers, purchasers, and users of air-operated pumps. The standard can assist purchasers in the selection and acquisition of an appropriate pump for their needs. The standard can also assist pump users to operate their pumps in an efficient and trouble-free manner and avoid common mistakes.

10.0.2 Scope

This standard applies to air-operated diaphragm and bellows pumps. An air-operated pump is a positive-displacement reciprocating pump used for general liquid transfer. It is driven by means of a compressed gas (usually air) from an outside source. Where “air” is used throughout this document, it should be taken to mean any compressed gas, but usually air.

Air-operated rotodynamic and rotary pumps are not included in this standard.

10.1 Types and nomenclature

10.1.1 Types of air-operated pumps

Air-operated pumps fall into the basic types shown in Figure 10.1.1.

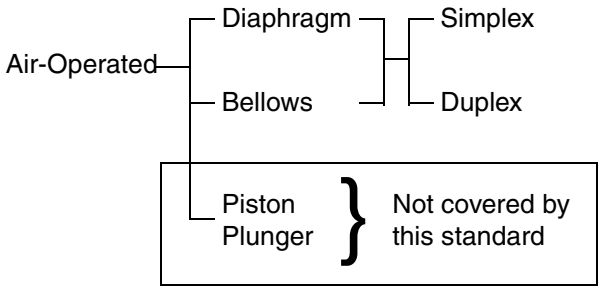

Figure 10.1.1 — Types of air-operated pumps

10.1.1.1 Air-operated diaphragm pump

An air-operated diaphragm pump contains a single diaphragm or double diaphragms connected to a connecting rod in which one side of the diaphragm is in contact with the liquid being pumped and the other side is in contact with the compressed air. A typical air-operated double diaphragm (AODD) pump configuration is shown in Figure 10.1.1.1.

10.1.1.2 Air-operated bellows pump

An air-operated bellows pump contains two bellows connected to a connecting rod in which one side of the bellows is in contact with the liquid being pumped and the other side is in contact with the compressed air. A typical configuration is shown in Figure 10.1.1.2.

10.1.2 Configuration of pumping devices

10.1.2.1 Simplex, single-acting

Contains one diaphragm or bellows and the working fluid (air or gas) acts or exerts pressure on one side of the diaphragm.

10.1.2.2 Duplex, single-acting

Contains two diaphragms or bellows and the working fluid (air or gas) acts or exerts pressure on one side of the diaphragm.