ASME B73.1-2026

(Revision of ASME B73.1-2020)

Specification for Horizontal End Suction Centrifugal Pumps for Chemical Process

AN AMERICAN NATIONAL STANDARD

The American Society of Mechanical Engineers

ASME B73.1-2026
(Revision of ASME B73.1-2020)

Specification for Horizontal End Suction Centrifugal Pumps for Chemical Process

AN AMERICAN NATIONAL STANDARD



The American Society of Mechanical Engineers

Two Park Avenue • New York, NY • 10016 USA

Date of Issuance: March 31, 2026

This Standard will be revised when the Society approves the issuance of a new edition.

This code or standard was developed under procedures accredited as meeting the criteria for American National Standards. The standards committee that approved the code or standard was balanced to ensure that individuals from competent and concerned interests had an opportunity to participate. The proposed code or standard was made available for public review and comment, which provided an opportunity for additional public input from industry, academia, regulatory agencies, and the public-at-large.

ASME does not "approve," "certify," "rate," or "endorse" any item, construction, proprietary device, or activity. ASME does not take any position with respect to the validity of any patent rights asserted in connection with any items mentioned in this document, and does not undertake to insure anyone utilizing a standard against liability for infringement of any applicable letters patent, nor does ASME assume any such liability. Users of a code or standard are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights, is entirely their own responsibility.

Participation by federal agency representatives or persons affiliated with industry is not to be interpreted as government or industry endorsement of this code or standard.

ASME accepts responsibility for only those interpretations of this document issued in accordance with the established ASME procedures and policies, which precludes the issuance of interpretations by individuals.

The endnotes and preamble in this document (if any) are part of this American National Standard.



ASME Collective Membership Mark

All rights reserved. "ASME" and the above ASME symbol are registered trademarks of The American Society of Mechanical Engineers. No part of this document may be copied, modified, distributed, published, displayed, or otherwise reproduced in any form or by any means, electronic, digital, or mechanical, now known or hereafter invented, without the express written permission of ASME. No works derived from this document or any content therein may be created without the express written permission of ASME. Using this document or any content therein to train, create, or improve any artificial intelligence and/or machine learning platform, system, application, model, or algorithm is strictly prohibited.

The American Society of Mechanical Engineers
Two Park Avenue, New York, NY 10016-5990

Copyright © 2026 by
THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS

CONTENTS

Foreword v

Committee Roster vii

Correspondence With the B73 Committee viii

1 Scope 1

2 References 1

3 Alternative Designs 8

4 Nomenclature and Definitions 8

5 Design and Construction Features for Metallic Pumps 8

6 Design and Construction Features for Thermoplastic Polymer, Thermoset Polymer, and Fluoropolymer-Lined Metallic Pumps 23

7 General Information 27

8 Documentation 31

Mandatory Appendices

I ASME Centrifugal Pump Data Sheet (as of October 2025) 35

II Mechanical Seal and Packing Configuration Codes 44

Nonmandatory Appendices

A Electronic Data Exchange 46

B Hydraulic Selection Criteria 47

Figures

5.4.3-1 Impeller Dimensions to Determine Single-Plane or Two-Plane Balance 10

5.5.3-1 Shaft Sleeve Runout 10

5.6.2-1 Cylindrical Seal Chamber 11

5.6.2-2 Self-Venting Tapered Seal Chamber 12

5.6.2.1-1 Seal Chamber Face Runout 12

5.6.2.1-2 Seal Chamber Register Concentricity 12

5.6.3-1 Universal Cover 13

5.6.4-1 Packing Box 14

5.13.8-1 Pump With C-Face Motor Adapter, Short Coupled 22

6.6.3-1 Cover With Bolt on Seal Chamber 25

6.6.5-1 Cover With Clamp Ring 26

8.3.1-1 Sample Outline Drawing 32

II-1 Mechanical Seal and Packing Configuration Codes 45

Tables

1-1 Pump Dimensions 2

1-2 Baseplate Dimensions 5
5.8.1.2-1 Pump Material Classification Codes 16
5.8.1.3-1 ASTM Material Specifications 17
5.8.3.1-1 Minimum Requirements for Auxiliary Piping Materials 19
5.12.1-1 Welding Requirements 19
6.1.1.1-1 Thermoplastic and Thermoset Pump Minimum Design Pressures 24
7.1.9.1-1 Published Performance Curve Rated Speeds 28
7.2.2.3-1 Specified Nondestructive Testing Levels 30
8.3.1-1 Tapped Opening Markings 33

Forms

I-1 Centrifugal Pump Data Sheet (U.S. Customary) 36
I-1M Centrifugal Pump Data Sheet (SI) 40

FOREWORD

In 1955, the Standards Committee on Centrifugal Pumps for Chemical Industry Use, B73, undertook the development of centrifugal pump standards to meet the needs of the chemical industry. Although the Standards Committee had not completed its assignment, the work of one of its task forces resulted in the development of a de facto standard that was published by the Manufacturing Chemists Association in 1962 as an American Voluntary Standard (AVS). More than a dozen manufacturers of chemical process pumps marketed pumps conforming with the AVS.

In 1965, the Hydraulic Institute published a tentative standard similar in content to the AVS, but updated certain portions. Although the Hydraulic Institute Tentative Standard reflected more nearly the current practice of manufacturers and users, it was believed necessary to publish a new document that would supersede both the original AVS and the tentative standard, and that could incorporate the technical content of both documents and dimensional criteria and features generally accepted by manufacturers and users. The January 1968 revision of the AVS was therefore approved as an American National Standard under the existing standards method and published as ANSI B123.1-1971.

ANSI B73.1 superseded ANSI B123.1-1971 and was first published in 1974. The 1974 edition brought to 15 the number of pump sizes covered by the Standard. The committee continued to be active, adding 5 more sizes for a total of 20, and making a number of revisions in the text of the Standard.

Shortly thereafter, the American National Standards Committee B73 undertook to revise the Standard, and, as a result, new information on baseplate rigidity, bearing frame adapter, and bearing housing drain was introduced. The 1984 edition included, for the first time, information that covered documentation of the pump and driver outline drawing of the centrifugal pump, data sheet, mechanical seal drawing, packing box piping plans, and cooling/heating piping plans.

The 1991 edition included larger and self-venting tapered seal chambers, as well as conventional packing boxes; revised baseplate dimensions, with a new identification numbering system; and a ductile material requirement for the bearing frame adapter if it clamps the rear cover plate to the casing.

With the expanding utilization of the ASME B73.1 pumps in the chemical process industry and its growing acceptance in the hydrocarbons processing industry, the B73 committee continued to improve ASME B73.1. The 2001 edition of the Standard incorporated 7 new sizes of pumps, bringing the total number to 27. Many of the new additions were at the request of the user population. Inclusion of ISO standard size pumps was considered by the committee. It was consensus that the ISO inclusion would have made ASME B73.1 overly complex and weakened its mechanical fortitude. Thus, this action was rejected by the committee. The “Materials of Construction” section of the Standard was expanded to include readily available corrosion-resistant alloys. Recent publications by the Hydraulic Institute in areas such as baseplate tolerance, acceptable nozzle loads, preferred operating region, and NPSH margin were incorporated into this edition. A standardized electronic data exchange file specification was established as an integral portion of the Standard. This was, in part, in response to the needs of the user community for compliance to U.S. government regulations covering chemical process equipment and pumps, specifically OSHA Process Safety Management, 29 CFR 1910.119. In total, these revisions to the Standard were intended to better serve process industries and expand the use of ASME B73 pumps worldwide.

The 2012 edition of the Standard included several changes to reduce redundancy in the B73 set of standards and to better align with the Hydraulic Institute (HI) and American Petroleum Institute (API) pump standards. Revisions were made to further improve the reliability of the ASME B73.1 pumps. ASME B73.5 on solid polymer pumps was merged into ASME B73.1 due to the many similarities of the two standards. ASME B73.5 was withdrawn. Reference was made to API practices for mechanical seal configurations and cooling and heating plans. A mechanical seal configuration code and a material classification code were added. A universal cover was added to the Standard as an alternate sealing cover. Requirements for the bearing frame were revised to ensure more robust pumps. C-face motor adapters were made an option. The default performance test acceptance grade was revised to reflect the new HI/ISO performance test standard. More detail was added to the required drawings, curve, and documentation that should be included with the pump. A new data sheet was developed and added to the Standard. The Standard endorsed the electronic data exchange standard that was developed by the HI and Fiatech Automating Equipment Information Exchange (AEX) project.

The 2020 edition included the following changes:

– Multiple HI references were updated.

– Specialty designs were developed upon the ASME B73.1 product line platform, including self-primer, recessed-impeller, low-flow, and repeller pumps.

– A solid shaft option was added.

– Additional bearing requirement details were added.
– Oil cooling details were added.
– Welding requirements were added.
– Safety guard, seal area guard, and coupling guard requirements were added.
– Baseplate requirements were added.
– Coupling requirements were added.
– Preferred operating region was added
– Tables for published performance curve rated speeds were added.
– Tables for approximate performance of standard pumps and minimum continuous flow were removed.
– Nondestructive testing levels were added.
– Details regarding document requirements, including details for the certified mill test report and statement of compliance, were added.

ASME B73.1-2026 has been revised to include the following changes:

– Thermoset and thermoplastic composites have been added to para. 4.2.
– Low temperature limits guidelines have been added.
– Additional details have been added to para. 5.3.9 gasket design criteria.
– Figure has been added to impeller balance para. 5.4.3.
– Welded and flanged auxiliary piping details have been added to para. 5.8.3.3 and new para. 5.8.3.4 has been added.
– Welding of austenitic stainless steels Note has been added to para. 5.12.3.1.
– RAL numbers have been removed from guard hazard communication sections.
– Steel material has been added to seal area safety guards construction section para. 5.13.7.2.
– New sections have been added on casing temperature, bearing temperature, and bearing vibration measurement sections.
– Fluoropolymer-lined metallic pumps have been added to section 6.
– Vacuum limits for both metallic and fluoropolymer-lined metallic pumps have been added to para. 6.1.1.1.
– Notes on fluoropolymer-lined metallic pumps have been added to paras. 6.3.1 and 6.3.2.
– Table 7.2.2.3-1 has been revised in its entirety.
– Nonmandatory Appendix B has been added.

ASME B73.1-2026 was approved as an American National Standard by the American National Standards Institute on February 23, 2026.

ASME B73 COMMITTEE
Chemical Standard Pumps

(The following is the roster of the committee at the time of approval of this Standard.)

STANDARDS COMMITTEE OFFICERS

D. W. Wood, *Chair*
A. Wilson, *Vice Chair*
D. Papert, *Secretary*

STANDARDS COMMITTEE PERSONNEL

J. Albright, Fluor Corp.
M. H. Basue, John Crane, Inc.
K. R. Burkhardt, DuPont
S. Camara, Chemtrade Logistics
D. Clark, HMD Kontro Sealless Pumps
L. Dobrot, ITT, Inc.
R. W. Estep, AVN Corp.
J. Gardner, Flowserve Corp.
F. Hernandez, Lewa-Nikkiso America, Inc.
J. Hubbard, ITT Goulds Pumps
B. S. Myers, Bayer Crop Science
D. Papert, The American Society of Mechanical Engineers
C. T. Ropp, Flowserve Corp.
C. Sakhalkar, Teikoku USA, Inc.
A. Wilson, Dow Chemical Co.
D. W. Wood, Chemours Co.
D. G. Grant, *Alternate*, Chemours Co.
P. W. Wilson, *Alternate*, Flowserve Corp.
P. J. Yehl, *Alternate*, ITT Goulds Pumps
K. Fiorini, *Contributing Member*, Eastman Chemical Co.
P. F. Gaydon, *Contributing Member*, Hydraulic Institute, Inc.
S. R. Kanikar, *Contributing Member*, Technip Energies
J. S. Simmons, *Contributing Member*, Occidental Oil & Gas Corp.

B73.1 HORIZONTAL END SUCTION PUMPS FOR CHEMICAL PROCESS SUBCOMMITTEE

R. W. Estep, *Chair*, AVN Corp.
M. H. Basue, John Crane, Inc.
S. Camara, Chemtrade Logistics
L. Dobrot, ITT, Inc.
J. Gardner, Flowserve Corp.
D. G. Grant, Chemours Co.
J. Hubbard, ITT Goulds Pumps
B. S. Myers, Bayer Crop Science
C. T. Ropp, Flowserve Corp.
A. Wilson, Dow Chemical Co.
D. W. Wood, Chemours Co.

CORRESPONDENCE WITH THE B73 COMMITTEE

General. ASME codes and standards are developed and maintained by committees with the intent to represent the consensus of concerned interests. Users of ASME codes and standards may correspond with the committees to propose revisions or cases, report errata, or request interpretations. Correspondence for this Standard should be sent to the staff secretary noted on the committee's web page, accessible at https://go.asme.org/B73committee.

Revisions and Errata. The committee processes revisions to this Standard on a periodic basis to incorporate changes that appear necessary or desirable as demonstrated by the experience gained from the application of the Standard. Approved revisions will be published in the next edition of the Standard.

In addition, the committee may post errata on the committee web page. Errata become effective on the date posted. Users can register on the committee web page to receive email notifications of posted errata.

This Standard is always open for comment, and the committee welcomes proposals for revisions. Such proposals should be as specific as possible, citing the paragraph number, the proposed wording, and a detailed description of the reasons for the proposal, including any pertinent background information and supporting documentation.

Cases

(a) The most common applications for cases are

(1) to permit early implementation of a revision based on an urgent need

(2) to provide alternative requirements

(3) to allow users to gain experience with alternative or potential additional requirements prior to incorporation directly into the Standard

(4) to permit the use of a new material or process

(b) Users are cautioned that not all jurisdictions or owners automatically accept cases. Cases are not to be considered as approving, recommending, certifying, or endorsing any proprietary or specific design, or as limiting in any way the freedom of manufacturers, constructors, or owners to choose any method of design or any form of construction that conforms to the Standard.

(c) A proposed case shall be written as a question and reply in the same format as existing cases. The proposal shall also include the following information:

(1) a statement of need and background information

(2) the urgency of the case (e.g., the case concerns a project that is underway or imminent)

(3) the Standard and the paragraph, figure, or table number

(4) the editions of the Standard to which the proposed case applies

(d) A case is effective for use when the public review process has been completed and it is approved by the cognizant supervisory board. Approved cases are posted on the committee web page.

Interpretations. The committee does not issue interpretations for this Standard.

Committee Meetings. The B73 Standards Committee regularly holds meetings that are open to the public. Persons wishing to attend any meeting should contact the secretary of the committee. Information on future committee meetings can be found on the committee web page at https://go.asme.org/B73committee.

SPECIFICATION FOR HORIZONTAL END SUCTION CENTRIFUGAL PUMPS FOR CHEMICAL PROCESS

1 SCOPE

(a) This Standard is a design and specification standard that covers metallic, thermoplastic polymer, thermoset polymer, and fluoropolymer-lined centrifugal pumps of horizontal, end suction single stage, centerline discharge design. This Standard includes dimensional interchangeability requirements and certain design features to facilitate installation and maintenance and to enhance reliability and safety of B73.1 pumps. It is the intent of this Standard that pumps of the same standard dimension designation from all sources of supply shall be interchangeable with respect to mounting dimensions, size, and location of suction and discharge nozzles, input shafts, baseplates, and foundation bolt holes (see Tables 1-1 and 1-2). Maintenance and operation requirements are not included in this Standard.

(b) This Standard has been revised to include solid polymer pumps formerly covered under ASME B73.5. The design and construction features for metallic pumps are covered in section 5. The design and construction features for solid polymer pumps are covered in section 6. This Standard must be read in its entirety for proper application.

(c) This Standard has been revised to broaden the scope to include specialty designs developed on ASME B73.1 product line platforms. These specialty designs have many common components with the B73.1 models and meet the intent of the Standard except for most notably the Standard's dimensional and hydraulic coverage requirements. These specialty designs include pump models referred to as self-primer, recessed impeller, low flow, and repeller pumps.

(d) Sealless Pumps (Magnetic Drive and Canned Motor) are covered in ASME B73.3.

2 REFERENCES

The following documents form a part of this Standard to the extent specified herein. The latest edition shall apply.

ANSI B11.19. Performance Criteria for Safeguarding. Association for Manufacturing Technology.

ANSI/ABMA-9. Load Ratings and Fatigue Life for Ball Bearings. American Bearing Manufacturers Association.

ANSI/ABMA-11. Load Ratings and Fatigue Life for Roller Bearings. American Bearing Manufacturers Association.

ANSI/AGMA 9000. Flexible Couplings — Potential Unbalance Classification. American Gear Manufacturers Association.

ANSI/AGMA 9002. Bores and Keyways for Flexible Couplings (Inch Series). American Gear Manufacturers Association.

ANSI/HI 9.1-9.5. Pumps — General Guidelines for Materials, Sound Testing, and Decontamination. Hydraulic Institute.

ANSI/HI 9.6.1. Rotodynamic Pumps — Guideline for NPSH Margin. Hydraulic Institute.

ANSI/HI 9.6.2. Rotodynamic Pumps for Assessment of Applied Nozzle Loads. Hydraulic Institute.

ANSI/HI 9.6.3. Rotodynamic (Centrifugal and Vertical) Pumps — Guideline for Allowable Operating Region. Hydraulic Institute.

ANSI/HI 9.6.4. Rotodynamic Pumps Vibration Measurements and Allowable Values. Hydraulic Institute.

ANSI/HI 9.6.8. Dynamics of Pumping Machinery. Hydraulic Institute.

ANSI/HI 14.1-14.2. Rotodynamic Pumps for Nomenclature and Definitions. Hydraulic Institute.

ANSI/HI 14.3. Rotodynamic Pumps for Design and Application. Hydraulic Institute.

ANSI/HI 14.4. Rotodynamic Pumps for Manuals Describing Installation, Operation and Maintenance. Hydraulic Institute.

ANSI/HI 14.6. Rotodynamic Pumps for Hydraulic Performance Acceptance Tests. Hydraulic Institute.

API Std 610. Centrifugal Pumps for Petroleum, Petrochemical and Natural Gas Industries. American Petroleum Institute.

API Std 682. Pumps — Shaft Sealing Systems for Centrifugal and Rotary Pumps. American Petroleum Institute.

ASME B16.5. Pipe Flanges and Flanged Fittings. The American Society of Mechanical Engineers.

ASME B16.11. Forged Steel Fittings, Socket-Welding and Threaded. The American Society of Mechanical Engineers.

ASME B16.42. Ductile Iron Pipe Flanges and Flanged Fittings: Classes 150 and 300. The American Society of Mechanical Engineers.

ASME B31.3. Process Piping. The American Society of Mechanical Engineers.