ASME B73.3-2022
(Revision of ASME B73.3-2015)

Specification for Sealless Horizontal End Suction Centrifugal Pumps for Chemical Process

AN AMERICAN NATIONAL STANDARD

The American Society of Mechanical Engineers

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FOREWORD

In 1991, ASME Standards Committee B73, Chemical Standard Pumps, formed a sealless pump working group to develop a standard for sealless pumps that would correspond to ASME B73.1M, Specification for Horizontal End Suction Centrifugal Pumps for Chemical Process.

Though these pumps are sealless (i.e., they do not use a dynamic seal to prevent leakage around the drive shaft), leakage can result from certain types of wear or misoperation. The user must take appropriate supplemental safety precautions when operating these pumps.

The first edition of this Standard was approved as an American National Standard by the American National Standards Institute (ANSI) on August 7, 1997.

In the following years, the sealless working group developed a revision of ASME B73.3M to reflect changes made in ASME B73.1M. In the 2003 revision of ASME B73.3, the presentation of units was changed to reflect that U. S. Customary units are the primary units of measurement. Some paragraphs were simplified and clarified, and the sections on flanges and flange loading were revised, as were sound and vibration requirements. Information concerning "Operating Region" and "NPSH Margin" was added; auxiliary connection symbols and additional pump sizes were also added. Table 3 was revised to reflect changes in Frame 1 pump dimensions; Table 7 was added; and Form 1 was revised to reflect additional required values.

The 2015 revision of the Standard included several changes to reduce redundancy in ASME B73 standards and to better align with Hydraulic Institute standards (HI). Revisions were also made to further improve the reliability of ASME B73.3 pumps. Reference is now made to the HI standard for fluid circulation piping plans and a material classification code was added to ASME B73.3. The table for ASTM material specifications was expanded; a table for minimum requirements for auxiliary piping materials added; requirements for the bearing housing revised to assure more robust pumps; and plastic-lined magnetic drive pumps added to the scope of the standard. Close-coupled pumps were also added as an option and close-coupled pump baseplates shortened accordingly. 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 included with the pump and a new data sheet was developed and added to the standard. ASME B73.3 endorses the Electronic Data Exchange standard developed by HI and the FIATECH Automating Equipment Information Exchange (AEX) project.

Many of the modifications to the 2022 edition of this Standard align the requirements of ASME B73.3 with the 2020 revision of ASME B73.1. Revisions to ASME B73.3 include

(a) modified canned motor pump stator liner material, rotor liner material, and construction requirements

(b) new functional life requirement for canned motor pump (CMP) secondary control systems

(c) modified external bearing design requirements and clarified external bearing life requirements

(d) new and clarified requirements for greased for life external bearings

(e) modified magnetic drive pump (MDP) and CMP material classification codes including adding new materials such as Alloy C22 as well as many new wetted bearing materials

(f) new requirements for auxiliary piping

(g) new corrosion allowances

(h) new welding requirements including details on autogenous welding

(i) revised safety guard and coupling guard requirements

(j) additional baseplate options and requirements including nonmetallic baseplates and free-standing baseplates

(k) close coupled motor adaptor requirements for MDPs

(l) modified requirements for vibration to reference HI standards

(m) published performance curve rated speeds for MDPs and CMPs

(n) details on hydrostatic test requirements along with adding thermoset polymer material pumps

(o) modified pump performance requirements, including the acceptance test grade to ANSI/HI 14.6-2016 Grade 1B

(p) modified connection welds and casting test requirements

(q) modified nameplate requirements for MDP and CMP

(r) details regarding document requirements, including details for Certified Mill Test Report and Statement of Compliance

ASME B73.3-2022 was approved by ANSI as an American National Standard on July 25, 2022.

ASME B73 COMMITTEE
Chemical Standard Pumps

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

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A. Wilson, The Dow Chemical Co.
P. Wilson, Flowserve Corp.
P. J. Yehl, ITT Goulds Pumps

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 e-mail 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(s), 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(s)

(4) the edition(s) 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 athttps://go.asme.org/B73committee.

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SPECIFICATION FOR SEALLESS HORIZONTAL END SUCTION CENTRIFUGAL PUMPS FOR CHEMICAL PROCESS

1 SCOPE

(a) This Standard is a design and specification standard that covers metallic and plastic-lined sealless 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 enhance reliability and safety of ASME B73.3 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 through 1-5 (Tables 1-1M through 1-5M)]. Maintenance and operation requirements are not included in this Standard.

(b) This Standard has been revised to broaden the scope to include specialty designs developed for ASME B73.3 product line platforms. These specialty designs have many components in common with the ASME B73.3 models and meet the intent of the standard but not the standard's dimensional requirements. These specialty designs include pump models referred to as self-primer and single-stage low flow pumps.

2 REFERENCES

The following is a list of publications referenced in this Standard. Unless otherwise specified, the latest edition shall apply.

ANSI B11.19. Performance Requirements for Risk Reduction Measures: Safeguarding and other Means of Reducing Risk. American National Standards Institute.
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/AWS D1.1. Structural Welding Code — Steel. American Welding Society.
ANSI/HI 1.3. Rotodynamic Centrifugal Pumps for Design and Applications. Hydraulic Institute.
ANSI/HI 1.4. Rotodynamic Centrifugal Pumps for Manuals Describing Installation, Operation, and Maintenance. Hydraulic Institute.
ANSI/HI 5.1–5.6. Sealless Rotodynamic Pumps for Nomenclature, Definitions, Applications, Operation, and Test. Hydraulic Institute.
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 9.6.2-2021. Rotodynamic Pumps for Assessment of Applied Nozzle Loads. Hydraulic Institute.
ANSI/HI 9.6.4. Rotodynamic Pumps for Vibration Measurements and Allowable Values. Hydraulic Institute.
ANSI/HI 9.6.8. Rotodynamic Pumps — Guidelines for Dynamics of Pumping Machinery. Hydraulic Institute.
ANSI/HI 14.3. Rotodynamic Pumps for Design and Application. Hydraulic Institute.
ANSI/HI 14.6. Rotodynamic Pumps for Hydraulic Performance Acceptance Tests. Hydraulic Institute.
ANSI/HI 50.7. Electronic Data Exchange for Pumping Equipment. Hydraulic Institute.
ASME B16.1. Pipe Flanges and Flanged Fittings: NPS ½ through NPS 24 Metric/Inch Standard. The American Society of Mechanical Engineers.
ASME B16.11. Forged 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.
ASME Boiler and Pressure Vessel Code, Section II. Materials — Part D, Properties [(Customary) or (Metric)]. The American Society of Mechanical Engineers.
ASME Boiler and Pressure Vessel Code, Section III. Rules for Construction of Nuclear Facility Components — Division 1, Subsection NCD, Class 2 and Class 3 Components. The American Society of Mechanical Engineers.