ASME B73.3-2015
[Revision of ASME B73.3-2003 (R2008)]

# Specification for Sealless Horizontal End Suction Centrifugal Pumps for Chemical Process

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The American Society of Mechanical Engineers
Two Park Avenue • New York, NY • 10016 USA

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

# CONTENTS


Foreword ..... v
Committee Roster ..... vi
Correspondence With the B73 Committee ..... vii

**1 Scope** ..... 1

**2 References** ..... 1

**3 Alternative Designs** ..... 14
3.1 Extended Length Pump Design ..... 14
3.2 Close Coupled Design ..... 14
3.3 Alternative Design ..... 14

**4 Nomenclature and Definitions** ..... 15
4.1 Definitions of Terms ..... 15
4.2 Additional Definitions ..... 15

**5 Design and Construction Features** ..... 15
5.1 Pressure and Temperature Limits ..... 15
5.2 Flanges ..... 16
5.3 Casing ..... 16
5.4 Impeller ..... 17
5.5 Internal Drive Assembly ..... 18
5.6 Containment Design ..... 18
5.7 Bearings, Lubrication, and Bearing Frame (MDP) ..... 20
5.8 Outer Magnet Assembly (MDP) ..... 20
5.9 Stator Assembly (CMP) ..... 21
5.10 Materials of Construction ..... 21
5.11 Auxiliary Piping ..... 21
5.12 Corrosion Allowance ..... 21
5.13 Direction of Rotation ..... 21
5.14 Dimensions ..... 25
5.15 Miscellaneous Design Features ..... 25
5.16 Monitoring Devices ..... 26

**6 General Information** ..... 26
6.1 Application ..... 26
6.2 Performance Curves ..... 27
6.3 Tests and Inspections ..... 27
6.4 Nameplates ..... 31

**7 Documentation** ..... 31
7.1 General ..... 31
7.2 Requirements ..... 31
7.3 Document Description ..... 31
7.4 Specially Requested Documentation ..... 35

**Figures**
5.3.5.1-1 Cooling and Heating Pipe Plans ..... 17
5.5.5.5-1 Plan 114 Modified ..... 19
5.16.4-1 CMP Vibration Measurement Locations ..... 27
7.3.1-1 Pump and Driver Outline Drawing for Separately Coupled Magnetic Drive Pumps ..... 32
7.3.1-2 Pump and Driver Outline Drawing for Canned Motor Pumps ..... 33

**Tables**


| | | |
|---|---|---|
| 1-1 | Pump Dimensions for Separately Coupled Magnetic Drive Pumps | 2 |
| 1-2 | Baseplate Dimensions for Separately Coupled Magnetic Drive Pumps | 5 |
| 2-1 | Baseplate Dimensions for Close Coupled Magnetic Drive Pumps | 7 |
| 3-1 | Pump Dimensions for Canned Motor Pumps | 9 |
| 3-2 | Baseplate Dimensions for Canned Motor Pumps | 11 |
| 5.10.1.2-1 | Magnetic Drive and Canned Motor Pump Material Classification Codes | 22 |
| 5.10.1.3-1 | ASTM Material Specifications | 24 |
| 5.11.1-1 | Minimum Requirements for Auxiliary Piping Materials | 25 |
| 6.1.5-1 | Approximate Hydraulic Coverage, 50 Hz | 28 |
| 6.1.5-2 | Approximate Hydraulic Coverage, 60 Hz | 29 |
| 6.1.6.1-1 | Minimum Continuous Flow | 30 |


**Mandatory Appendix**


| | | |
|---|---|---|
| I | ASME Sealless Centrifugal Pump Data Sheet | 37 |


**Nonmandatory Appendix**


| | | |
|---|---|---|
| A | Electronic Data Exchange | 44 |

# FOREWORD

In 1991 the 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 occur as a result of 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 on August 7, 1997.

In the intervening years, work continued on a revision of ASME B73.1M. As that work drew near to completion, the sealless working group began to develop a revision of the 1997 edition of ASME B73.3M to reflect the changes being made in ASME B73.1M. The 2003 revision of the ASME B73.3 Standard included

• Some paragraphs were simplified and clarified.
• The presentation of units was changed to reflect that the U.S. Customary units were the primary units of measurement.
• The sections on flanges and flange loading were revised.
• Sound and vibration requirements were revised.
• Information concerning “Operating Region” and “NPSH Margin” was added.
• Auxiliary connection symbols were added.
• Additional pump sizes were added.
• Table 3 was revised to reflect changes in the Frame 1 pump dimensions.
• Table 7, Minimum Continuous Flow, was added.
• Form 1 was revised to reflect additional required values.

This revision of the Standard includes several changes to reduce redundancy in the B73 set of standards and to better align with the Hydraulic Institute standards. Revisions have also been made to further improve the reliability of the B73.3 pumps. Reference is now made to the Hydraulic Institute standard for fluid circulation piping plans. A material classification code has been added to B73.3. The table for ASTM material specifications has been expanded and a table for minimum requirements for auxiliary piping materials has been added. Requirements for the bearing frame have been revised to assure more robust pumps. Plastic lined magnetic drive pumps have been added to the scope of the standard due to their prevalence throughout the chemical industry. Close coupled pumps are also an option and close coupled pump baseplates have been shortened accordingly. The default performance test acceptance grade has been 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 has been developed and added to the standard. The standard endorses the Electronic Data Exchange standard which was developed by the Hydraulic Institute and FIATECH Automating Equipment Information Exchange (AEX) project.

Suggestions for improvement of this Standard will be welcome and should be sent to The American Society of Mechanical Engineers, Attn.: Secretary, B73 Committee, Two Park Avenue, New York, NY 10016-5990.

This Standard was approved as an American National Standard on October 30, 2015.

# 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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**General.** ASME Standards are developed and maintained with the intent to represent the consensus of concerned interests. As such, users of this Standard may interact with the Committee by proposing revisions or a Case and attending Committee meetings. Correspondence should be addressed to:

Secretary, B73 Standards Committee
The American Society of Mechanical Engineers
Two Park Avenue
New York, NY 10016-5990
http://go.asme.org/Inquiry

**Proposing Revisions.** Revisions are made periodically to the Standard 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 periodically.

The Committee welcomes proposals for revisions to this Standard. 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 documentation.

**Proposing a Case.** Cases may be issued for the purpose of providing alternative rules when justified, to permit early implementation of an approved revision when the need is urgent, or to provide rules not covered by existing provisions. Cases are effective immediately upon ASME approval and shall be posted on the ASME Committee Web page.

Requests for Cases shall provide a Statement of Need and Background Information. The request should identify the Standard and the paragraph, figure, or table number(s), and be written as a Question and Reply in the same format as existing Cases. Requests for Cases should also indicate the applicable edition(s) of the Standard to which the proposed Case applies.

**Attending Committee Meetings.** The B73 Standards Committee regularly holds meetings and/or telephone conferences that are open to the public. Persons wishing to attend any meeting and/or telephone conference should contact the Secretary of the B73 Standards Committee. Future Committee meeting dates and locations can be found on the Committee Page at go.asme.org/B73committee.

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# SPECIFICATION FOR SEALLESS HORIZONTAL END SUCTION CENTRIFUGAL PUMPS FOR CHEMICAL PROCESS

## 1 SCOPE

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 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, 1-1M, 1-2, 1-2M, 2-1, 2-1M, 3-1, 3-1M, 3-2, and 3-2M). Maintenance and operation requirements are not included in this Standard.

## 2 REFERENCES

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

ANSI B11.19, Performance Criteria for Safeguarding

Publisher: American National Standards Institute (ANSI), 25 West 43rd Street, New York, NY 10036 (www.ansi.org)

ANSI/ABMA-9, Load Ratings and Fatigue Life for Ball Bearings

ANSI/ABMA-11, Load Ratings and Fatigue Life for Roller Bearings

Publisher: American Bearing Manufacturers Association (ABMA), 2025 M Street, NW, Suite 800, Washington, DC 20036-3309 (www.americanbearings.org)

ANSI/HI 1.3, Rotodynamic (Centrifugal) Pumps — Design and Applications

ANSI/HI 1.4, Rotodynamic (Centrifugal) Pumps for Manuals Describing Installation, Operation and Maintenance

ANSI/HI 5.1 through 5.6, Sealless Rotodynamic Pumps for Nomenclature, Definitions, Applications, Operation, and Test

ANSI/HI 9.1 through 9.5, Pumps — General Guidelines

ANSI/HI 9.6.1, Rotodynamic Pumps — Guideline for NPSH Margin

ANSI/HI 9.6.2, Rotodynamic Pumps for Assessment of Applied Nozzle Loads

ANSI/HI 9.6.4, Rotodynamic Pumps for Vibration Measurements and Allowable Values

ANSI/HI 14.6, Rotodynamic Pumps for Hydraulic Performance Acceptance Tests

Publisher: Hydraulic Institute (HI), 6 Campus Drive, Parsippany, NJ 07054-4406 (www.pumps.org)

ASME B16.5, Pipe Flanges and Flanged Fittings

ASME B16.11, Forged Steel Fittings, Socket-Welding and Threaded

ASME B16.42, Ductile Iron Pipe Flanges and Flanged Fittings, Classes 150 and 300

ASME Boiler and Pressure Vessel Code, Section II, Part D

ASME Boiler and Pressure Vessel Code, Section III, Division 1, Subsection ND

ASME Boiler and Pressure Vessel Code, Section VIII, Divisions 1 and 2

Publisher: The American Society of Mechanical Engineers (ASME), Two Park Avenue, New York, NY 10016-5990 (www.asme.org)

ASTM A48/A48M, Standard Specification for Gray Iron Castings

ASTM A105/A105M, Standard Specification for Carbon Steel Forgings for Piping Applications

ASTM A106/A106M, Standard Specification for Seamless Carbon Steel Pipe for High-Temperature Service

ASTM A108, Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished

ASTM A182/A182M, Standard Specification for Forged or Rolled Alloy and Stainless Steel Pipe Flanges, Forged Fittings, and Valves and Parts for High-Temperature Service

ASTM A193/A193M, Standard Specification for Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature Service

ASTM A194/A194M, Standard Specification for Carbon and Alloy Steel Nuts for Bolts for High Pressure or High Temperature Service, or Both

ASTM A216/A216M, Standard Specification for Steel Castings, Carbon, Suitable for Fusion Welding, for High Temperature Service

ASTM A269, Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service