ASME B73.2-2016
[Revision of ASME B73.2-2003 (R2008)]

Specification for Vertical In-Line Centrifugal Pumps for Chemical Process

AN AMERICAN NATIONAL STANDARD

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Two Park Avenue • New York, NY • 10016 USA

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This Standard will be revised when the Society approves the issuance of a new edition. There will be no written interpretations of the requirements of this Standard issued to this edition.

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The American Society of Mechanical Engineers
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FOREWORD

The vertical in-line style of centrifugal pump was introduced for chemical process use. These pumps have certain advantages that have led to growing acceptance of this configuration for chemical process applications. In January 1969, in response to this interest, the Manufacturing Chemists Association (MCA) requested that the American National Standards Institute (ANSI) develop a standard. In 1971, the scope of B73 was expanded to include vertical in-line pumps, using the MCA draft of February 1971 as a basis.

American National Standard B73.2 was developed and was approved by the B73 Standards Committee; final approval by ANSI was granted on April 21, 1975.

Shortly thereafter, the American National Standards Committee B73 revised the Standard, introducing new information on critical speed, bearing housing design, vibration, bearing frame adapter, and bearings. The 1984 edition included, for the first time, an appendix that covered documentation of pump and driver outline drawing, a vertical in-line pump data sheet, mechanical seal drawing, stuffing box piping plans, and cooling/heating piping plans.

That edition was approved by letter ballot of the B73 Main Committee on April 25, 1983. Following acceptance by the Sponsor, the revision was referred to ANSI for designation as an American National Standard. Designation was granted on March 23, 1984.

In 1986, the Committee began discussing revisions that resulted in changes to the section on jackets. Additionally, the information on the stuffing box and seal chamber was expanded. Modifications were also made to the appendix drawings and plans.

These revisions were approved by the B73 Committee. Following B73 approval, the proposal was submitted to ANSI for recognition as an American National Standard. Approval was granted on January 22, 1991.

With the expanding utilization of ASME B73 pumps in the chemical process industry and their growing acceptance in the hydrocarbons processing industry, the B73 Committee has continued to improve the B73.2 Standard. The 2003 revision of the Standard incorporated the addition of the technical documentation of the pump as a mandatory portion of the Standard, which previously appeared as a nonmandatory appendix. The incorporation was partly 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. Recent publications by the Hydraulic Institute (HI) in areas such as preferred operating region and NPSH margin were incorporated into this revision. Additionally, the materials of construction section was expanded to include readily available corrosion-resistant alloy. In total, these revisions to the Standard were intended to better serve process industries and expand the use of ASME B73 pumps worldwide.

The 2016 edition of the Standard includes a number of revisions. Reference is made to the current API practices for mechanical seal configurations and cooling and heating plans. A mechanical seal configuration code that is aligned with the API sealing standard and a material classification code have been added to B73.2. A universal cover has been offered as an option to the Standard as an alternate sealing cover. Requirements for the bearing frame have been revised to ensure more robust pumps. Nomenclature for the pump sizes has been added to align with the more commonly used sizes identified in B73.1. Approximate hydraulic performance for the B73.2 pumps has been established. 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 common to the B73.1 and B73.2 Standards has been developed and added. This Standard endorses the Electronic Data Exchange standard, which was developed by the Hydraulic Institute and Fiatech AEX project. These revisions have been made to further improve the reliability of the B73.2 pumps. These changes also better align with the HI and API pump standards.

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

This revision was approved as an American National Standard on November 16, 2016.

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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CORRESPONDENCE WITH THE B73 COMMITTEE

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 to provide 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.

SPECIFICATION FOR VERTICAL IN-LINE CENTRIFUGAL PUMPS FOR CHEMICAL PROCESS

1 SCOPE

This Standard is a design and specification standard that covers metallic centrifugal pumps of vertical shaft single-stage design with suction and discharge nozzles in-line. This Standard includes dimensional interchangeability requirements and certain design features to facilitate installation and maintenance and enhance reliability and safety of B73.2 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 (see Table 1). Maintenance and operation requirements are not included in this Standard.

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 Requirements for Safeguarding

Publisher: Association for Manufacturing Technology (AMT), 7901 Westpark Drive, McLean, VA 22102-4206 (www.amtonline.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 (www.americanbearings.org)

ANSI/HI 1.1-1.2, Rotodynamic Centrifugal Pumps for Nomenclature and Definitions

ANSI/HI 1.3, Rotodynamic Centrifugal Pumps for Design and Application

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

ANSI/HI 9.1-9.5, Pumps — General Guidelines for Types, Applications, Definitions, Sound Measurements, and Documentation

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)

ANSI/NEMA MG 1, Motors and Generators

Publisher: National Electrical Manufacturers Association (NEMA), 1300 North 17th Street, Suite 900, Arlington, VA 22209 (www.nema.org)

API 610, Centrifugal Pumps for Petroleum, Petrochemical and Natural Gas Industries

API 682, Pumps-Shaft Sealing Systems for Centrifugal and Rotary Pumps

Publisher: American Petroleum Institute (API), 1220 L Street, NW, Washington, DC 20005 (www.api.org)

ASME B16.5, Pipe Flanges and Flanged Fittings

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

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

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

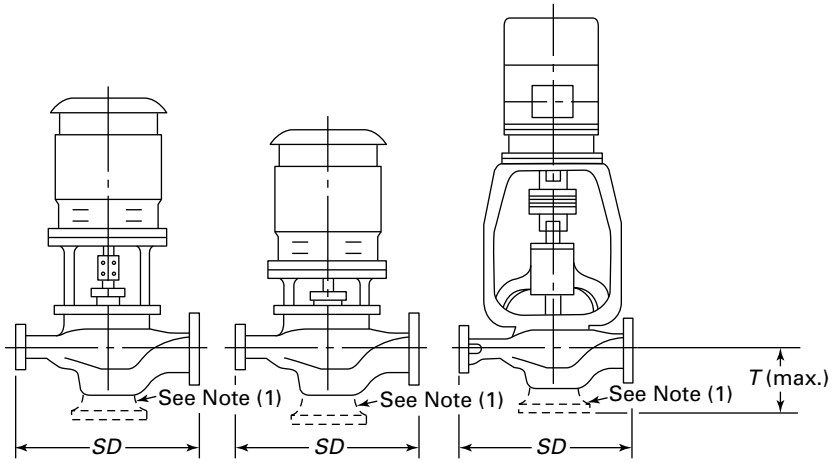
ASTM A106/A106M, Standard Specification for Seamless Carbon Steel Pipe for High-Temperature Service

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 for High-Temperature or High Pressure Service and Other Special Purpose Applications

Table 1 Pump Dimensions



Type VC **Type VM** **Type VB**

Dimension Designation [Note (2)]		Size; Suction × Discharge × Nominal Impeller Diameter		*SD*		*T*, Max.	
in.	(mm)	in.	(mm)	in. (+0.10, −0.08)	[mm (+2.5, −2.0)]	in.	(mm)
2015/15	(50-40-380)	2 × 1.5 × 6	(50 × 40 × 150)	14.96	(380)	6.89	(175)
2015/17	(50-40-430)	2 × 1.5 × 8	(50 × 40 × 200)	16.93	(430)	6.89	(175)
2015/19	(50-40-480)	2 × 1.5 × 10	(50 × 40 × 250)	18.9	(480)	6.89	(175)
3015/15	(80-40-380)	3 × 1.5 × 6	(80 × 40 × 150)	14.96	(380)	7.87	(200)
3015/19	(80-40-480)	3 × 1.5 × 8	(80 × 40 × 200)	18.9	(480)	7.87	(200)
3015/19	(80-40-480)	3 × 1.5 × 10	(80 × 40 × 250)	18.9	(480)	7.87	(200)
3015/24	(80-40-610)	3 × 1.5 × 13	(80 × 40 × 330)	24.02	(610)	7.87	(200)
3020/17	(80-50-430)	3 × 2 × 6	(80 × 50 × 150)	16.93	(430)	7.87	(200)
3020/17	(80-50-430)	3 × 2 × 7	(80 × 50 × 180)	16.93	(430)	7.87	(200)
3020/20	(80-50-510)	3 × 2 × 10	(80 × 50 × 250)	20.08	(510)	7.87	(200)
3020/24	(80-50-610)	3 × 2 × 13	(80 × 50 × 330)	24.02	(610)	7.87	(200)
4030/22	(100-80-560)	4 × 3 × 8	(100 × 80 × 200)	22.05	(560)	8.86	(225)
4030/25	(100-80-635)	4 × 3 × 10	(100 × 80 × 250)	25	(635)	8.86	(225)
4030/28	(100-80-710)	4 × 3 × 13	(100 × 80 × 330)	27.95	(710)	8.86	(225)
6040/24	(150-100-610)	6 × 4 × 9	(150 × 100 × 225)	24.02	(610)	9.84	(250)
6040/28	(150-100-710)	6 × 4 × 10	(150 × 100 × 250)	27.95	(710)	9.84	(250)
6040/30	(150-100-760)	6 × 4 × 13	(150 × 100 × 330)	29.92	(760)	9.84	(250)

NOTES:
(1) Optional separate pedestal.
(2) Pump designation defines design, flange sizes, and *SD* dimension (e.g., VC, VB 2015/15).