The American Society of
Mechanical Engineers

AN AMERICAN NATIONAL STANDARD

SPECIFICATION FOR HORIZONTAL END SUCTION CENTRIFUGAL PUMPS FOR CHEMICAL PROCESS

ASME B73.1-2001
[Revision of ASME B73.1M-1991(R1999)]

Date of Issuance: February 25, 2002

The next edition of this Standard is scheduled for publication in 2006. There will be no addenda or written interpretations of the requirements of this Standard issued to this edition.

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

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 which was published by the Manufacturing Chemists Association in 1962 as an American Voluntary Standard. More than a dozen manufacturers of chemical process pumps have been marketing pumps conforming with the AVS since that time.

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 which would supersede both the original AVS and the tentative standard, and which could incorporate the technical content of both documents, in addition to 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ANSI B73.1 superseded ANSI B123.1-1971 and was first published in 1974.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. Since then, the committee has continued to be active and has added five more sizes for a total of 20, and made 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 pump and driver outline drawing of the centrifugal pump, data sheet, mechanical seal drawing, stuffing box piping plans, and cooling/heating piping plans.

The 1991 revision included larger and self-venting tapered seal chambers, as well as conventional stuffing 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 has continued to improve the B73.1 standard. This revision of the Standard incorporates 7 new sizes of pumps, bringing the total number to 27. Many of the new additions were at the request of the user population. Although inclusion of “ISO” standard size pumps was entertained, the proposed additions of the “ISO” sizes were rejected by the committee. It was thought that the addition of the “ISO” sizes made the standard overly complex and weakened its mechanical fortitude. The material 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 have been incorporated into this revision. The former Appendix covering documentation has been established as an integral portion of the Standard. This is 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 are intended to better serve process industries and expand the use of ASME B73 pumps world wide.

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

This revision was approved as an American National Standard on September 7, 2001.

ASME STANDARDS COMMITTEE B73
Chemical Standard Pumps

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

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SPECIFICATION FOR HORIZONTAL END SUCTION CENTRIFUGAL PUMPS FOR CHEMICAL PROCESS

1 SCOPE

This Standard covers 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. 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 and 2).

2 ALTERNATIVE DESIGN

Alternate designs will be considered, provided they meet the intent of this Standard and cover construction and performance which are equivalent to and otherwise in accordance with these specifications. All deviations from these specifications shall be described in detail.

3 NOMENCLATURE AND DEFINITIONS

3.1 Source

All nomenclature and definitions of pump components shall be in accordance with HI 1.1–1.2.

4 DESIGN AND CONSTRUCTION FEATURES

4.1 Pressure and Temperature Limits

4.1.1 Pressure Limits. Pressure limitations shall be stated by the pump manufacturer.

4.1.1.1 The design pressure of the casing, including stuffing box or seal chamber and gland, shall be at least as great as the pressure-temperature rating of ASME B16.5 or ASME B16.42 Class 150 flanges for the material used.

4.1.1.2 The design pressure of jackets shall be at least 100 psig (690 kPa gage) at 340°F (170°C). Heating jackets may be required for jacket temperatures to 500°F (260°C) with a reduction in pressure corresponding to the reduction in yield strength of the jacket material.

4.1.1.3 Casing, stuffing box, cover or seal chamber, and jackets shall be designed to withstand a hydrostatic test at 1.5 times the maximum design pressure for the particular component and material of construction used (see para. 5.2.1).

4.1.2 Temperature Limits. Temperature limitations shall be stated by the pump manufacturer. Pumps should be available for temperatures up to 500°F (260°C). Jacketing and other modifications may be required to meet the operating temperature.

4.2 Flanges

Suction and discharge nozzles shall be flanged. Flanges shall conform to ASME B16.5 or ASME B16.42 Class 150 standards except that marking requirements are not applicable and the maximum acceptable tolerance on parallelism of the back of the flange shall be 3 deg and bolt holes may be tapped where noted in Table 1. Through bolt holes are preferred. When tapped holes are supplied, they shall be noted on the outline drawing. As an option, Class 300 flanges in accordance with ASME B16.5 or ASME B16.42 may be offered subject to the manufacturer's casing pressure-temperature limitations. All pumps regardless of flange rating shall conform to the X and Y dimensions shown in Table 1.

4.3 Casing

4.3.1 Drain Connection Boss(es). Pump casing shall have boss(es) to provide for drain connection(s) in the lowest part of the casing. Boss size shall accommodate $\frac{1}{2}$ in. NPT min. Boss(es) shall be drilled and tapped when specified by customer.

4.3.2 Auxiliary Connection Boss(es). The suction and discharge nozzles shall have boss(es) for gage connections. Boss size shall accommodate $\frac{1}{4}$ in. NPT min., $\frac{1}{2}$ in. NPT preferred. Boss(es) shall be drilled and tapped when specified by customer.