

ASME B1.3-2007
(Revision of ASME B1.3M-1992)

Screw Thread Gaging Systems for Acceptability: Inch and Metric Screw Threads

(UN, UNR, UNJ, M, and MJ)

AN AMERICAN NATIONAL STANDARD



**The American Society of
Mechanical Engineers**

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Three Park Avenue • New York, NY 10016

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FOREWORD

(a) The 1986 edition of this Standard was a combination of ANSI B1.3-1979 and ANSI B1.3M-1981. These earlier versions of this Standard were based upon the following instructions as defined by the B1 Committee at its meeting on October 7, 1976, which charged the B1.3 Subcommittee with the responsibility of preparing these documents.

The Subcommittee was to prepare a catalog of gages and gaging systems so that each gage or gaging system would be defined only in terms of the dimension(s) controlled and so that any material of an editorial nature that could be construed as giving preference to one gage or gaging system over another would be eliminated, as outlined in the following three statements:

- (1) All references to referee gaging methods are to be eliminated from all B1 documents.
- (2) A catalog of gaging systems is to be prepared by the B1.3 Subcommittee so that any description of the gage relates only to the specific dimension(s) it controls. All material of an editorial nature that could be construed as giving preference will be eliminated.
- (3) The level of dimensional acceptability shall be determined by the threaded product application and specified by American National Standards or other product standards, or by procurement drawings or documents.

Subsequently, the Subcommittee decided to combine these previous standards into one document and designate it ANSI/ASME B1.3M-1986, Screw Thread Gaging Systems for Dimensional Acceptability — Inch and Metric Screw Threads (UN, UNR, UNJ, M, and MJ).

(b) The 1992 edition included the following specific changes:

- (1) elimination of internal snap gages
- (2) addition of best wire size radius contacts to minimum material thread groove measurement gaging
- (3) clarification of out-of-round indicating gaging in Tables 1 and 2
- (4) addition of a reference to ASME B46.1, Surface Texture, to provide roughness average guidelines to be used for the evaluation of the surface texture of threaded products
- (5) addition of linear and coordinate measuring machines to the equipment included for thread evaluation
- (6) clarification that System 23 checks are not all mandatory
- (7) clarification relating to the measurement of changes in diameter size because of out-of-roundness conditions

(c) The 2007 edition includes the following specific changes:

- (1) removal of the words *dimensional* and *control(s)*, and replacement with the wording *inspect/evaluate* (and their related forms), because gages do not control the product dimension.
- (2) elimination of references to ASME B1.18M and B1.19M, due to those standards having previously been withdrawn. This also eliminates any reference to System 21A and its gages as previously listed in Tables 1, 2, 3, and 4 (B and C NOT GO segments and rolls, commonly referred to as a double NOT GO).
- (3) elimination of the use of cast replica determination of pitch diameter (and related features) for internal product inspection/evaluation.
- (4) qualification notes under Tables 1 and 2 with regard to variable gage inspection of functional diameter.
- (5) changed the numbering system in Tables 1, 2, 3, and 4 to provide consistency in numbering from table to table.

Suggestions for improvement of this Standard are welcome. They should be sent to Secretary, ASME B1 Standards Committee, Three Park Avenue, New York, NY 10016-5990.

This revision was approved as an American National Standard on March 5, 2007.

ASME B1 COMMITTEE

Screw Threads

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CORRESPONDENCE WITH THE B1 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 and attending Committee meetings. Correspondence should be addressed to:

Secretary, B1 Standards Committee
The American Society of Mechanical Engineers
Three Park Avenue
New York, NY 10016-5990

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, 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 B1 Standards Committee regularly holds meetings, which are open to the public. Persons wishing to attend any meeting should contact the Secretary of the B1 Standards Committee.

SCREW THREAD GAGING SYSTEMS FOR ACCEPTABILITY: INCH AND METRIC SCREW THREADS (UN, UNR, UNJ, M, AND MJ)

1 GENERAL

(a) This Standard presents screw thread gaging systems suitable for determining the acceptability of UN, UNR, UNJ, M, and MJ screw threads on externally and internally threaded products. It establishes the criteria for screw thread acceptance when a gaging system is used.

(b) A screw thread gaging system comprises a list of screw thread characteristics that must be inspected/evaluated to establish the acceptability of the screw threads on a threaded product and the gage(s) which shall be used when inspecting/evaluating those characteristics.

(c) *Federal Government Use.* This Standard is approved by the Department of Defense and federal agencies, and is incorporated into FED-STD-H28/20, Screw Thread Standards for Federal Services, Section 20. The use of this Standard by the federal government is subject to all the requirements and limitations of FED-STD-H28/20.

2 REFERENCE DOCUMENTS

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

ASME B1.1, Unified Inch Screw Threads (UN and UNR Thread Form)¹

ANSI/ASME B1.2, Gages and Gaging for Unified Inch Screw Threads¹

ASME B1.7, Screw Threads: Nomenclature, Definitions, and Letter Symbols¹

ASME B1.13M, Metric Screw Threads: M Profile¹

ASME B1.15, Unified Inch Screw Threads (UNJ Thread Form)

ANSI/ASME B1.16M, Gages and Gaging for Metric M Screw Threads¹

ASME B1.21M, Metric Screw Threads: MJ Profile¹

ANSI/ASME B1.22M, Gages and Gaging for MJ Series Metric Screw Threads¹

ASME B46.1, Surface Texture (Surface Roughness, Waviness, and Lay)¹

¹ May also be obtained from American National Standards Institute, 25 West 43rd Street, New York, NY 10036.

ASME/ANSI B47.1, Gage Blanks¹

Publisher: The American Society of Mechanical Engineers (ASME), Three Park Ave, New York, NY 10016-5990; Order Department: 22 Law Drive, Box 2300, Fairfield, NJ 07007-2300

3 SCREW THREAD GAGES AND MEASURING EQUIPMENT

(a) Tables 1 and 2, for external and internal screw threads, respectively, are listings of screw thread gages, gaging elements, and measuring equipment.

NOTE: Throughout the remainder of this Standard, the term gage includes any gages, gaging elements, and measuring equipment listed in Tables 1 and 2. See para. 5(d).

For each gage, these tables specify the thread characteristic(s) for which the gages are designated for determining conformance.

(b) The tables are arranged to establish product screw thread acceptance criteria based on recognized gaging concepts used to assess conformance.

(1) *Attributes.* Fixed limit inspection/evaluation provides a qualitative assessment of a characteristic(s) using gages which determine conformance.

(2) *Variables.* Indicating control is a quantitative and qualitative assessment on a characteristic(s) which is then compared with limiting values in order to determine if the characteristic(s) is in conformance.

4 GAGING SYSTEMS

(a) Tables 3 and 4 present screw thread gaging systems for inspection/evaluation of externally and internally threaded products, respectively.

(b) Three gaging systems for inspection/evaluation of threads on threaded products are established herein to provide a choice depending on the engineering requirement of the threaded product. These are identified as Systems 21, 22, and 23. The difference between gaging systems is the level of inspection/evaluation deemed necessary to satisfy that conformance has been achieved.

(c) Since most screw thread applications do not require that all of the characteristics described in the