ASME B16.21-2005

(Revision of ASME B16.21-1992)

Nonmetallic Flat Gaskets for Pipe Flanges

AN AMERICAN NATIONAL STANDARD

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The next edition of this Standard is scheduled for publication in 2010. There will be no addenda issued to this edition.

ASME issues written replies to inquiries concerning interpretations of technical aspects of this Standard. Interpretations are published on the ASME Web site under the Committee Pages at http://www.asme.org/codes/ as they are issued.

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FOREWORD

Before this standard was issued, the individual sizes of gaskets were made to many different sets of dimensions, based on different concepts of adaptation and functional use on the part of consumers as well as manufacturers. In some cases dimensions were shown in American Standards. To standardize gasket sizes, the Standards and Specifications Committee of the Mechanical Packing Association started work on a standard for nonmetallic or cut gaskets for bronze, iron, and steel pipe flanges.

Dimensions of gaskets being used were collected, and a basic design philosophy for sizing was formulated by the committee. This was the result of extensive field research experience and accepted standard user requirements. The procedure followed was to dimension the gasket for each type and size of flange so as to prevent the gasket from projecting into the line of flow. Dimensional tolerances of standard pipe flanges and fittings as to I.D., O.D., and bolting were all considered.

Suggested dimensional standards were tabulated and distributed for industry comment. After several revisions, a final draft, dated September 15, 1948, was approved by the Mechanical Packing Association for submission as an American Standard.

Sectional Committee (B16) on the Standardization of Pipe Flanges and Fittings was organized in 1921 under the procedure of the American Standards Association with the Heating, Piping, and Air Conditioning Contractors' National Association, Manufacturers' Standardization Society of the Valve and Fittings Industry, and the American Society of Mechanical Engineers as joint sponsors.

Sectional Committee B16 received the proposal on May 9, 1949, and assigned it to a joint group of Subcommittees 1 and 3. The Manufacturers' Standardization Society was also consulted as the proposal included gaskets for bronze flanges made to their Standard Practice SP-2. This joint group offered a revision of the original design concept for sizing, which was acceptable to the Mechanical Packing Association's Committee (now the Fluid Sealing Association). The Standard was approved as an American Standard on December 5, 1951, with the designation ASA B16.21-1951.

In 1961, the Standard was reviewed by the members of Subcommittee No. 7 on Gaskets and proposals for revision and updating the Standard were agreed upon. The American Standards Association granted approval of the revision on March 20, 1962 following sectional committee and sponsor approval.

In the mid-1960s, work had begun on a revision. The revision became a complete rewrite and included gaskets for API Std 601, MSS SP-44 and SP-51, as well as complete metric equivalents for all dimensions. Following its approval by the B16 Standards Committee and Co-Secretariat organizations, this Standard was approved as an American National Standard by ANSI on May 2, 1978.

In 1982, American National Standards Committee B16 was reorganized as an ASME Committee operating under procedures accredited by ANSI.

In 1989, general revisions had begun to reflect the current size ranges covered by the corresponding flange standard. Gasket dimensions for tongue and groove, male and female Rating Classes above 900 were deleted because a survey indicated these nonmetallic gaskets were almost never used for these joints. Tolerances to the dimensions were added.

Following approval by the Standards Committee and ASME, approval as an American National Standard was given by ANSI on March 16, 1992, with the new designation ASME B16.21-1992.

In 2005, the Standard adopted metric (SI) dimensions. Following approval by the B16 Subcommittee G, the B16 Standards Committee, and ASME, ANSI approved this American National Standard on March 16, 2005.

All requests for interpretation or suggestions for revisions should be sent to the Administrative Secretary B16, The American Society of Mechanical Engineers, Three Park Avenue, New York, NY 10016-5990.

ASME B16 COMMITTEE
Standardization of Valves, Flanges, Fittings, and Gaskets

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

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CORRESPONDENCE WITH THE B16 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 requesting interpretations, proposing revisions, and attending Committee meetings. Correspondence should be addressed to:

Secretary, B16 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.

Interpretations. Upon request, the B16 Committee will render an interpretation of any requirement of the Standard. Interpretations can only be rendered in response to a written request sent to the Secretary of the B16 Standards Committee.

The request for interpretation should be clear and unambiguous. It is further recommended that the inquirer submit his/her request in the following format:

Subject:	Cite the applicable paragraph number(s) and the topic of the inquiry.
Edition:	Cite the applicable edition of the Standard for which the interpretation is being requested.
Question:	Phrase the question as a request for an interpretation of a specific requirement suitable for general understanding and use, not as a request for an approval of a proprietary design or situation. The inquirer may also include any plans or drawings which are necessary to explain the question; however, they should not contain proprietary names or information.

Requests that are not in this format will be rewritten in this format by the Committee prior to being answered, which may inadvertently change the intent of the original request.

ASME procedures provide for reconsideration of any interpretation when or if additional information that might affect an interpretation is available. Further, persons aggrieved by an interpretation may appeal to the cognizant ASME Committee or Subcommittee. ASME does not "approve," "certify," "rate," or "endorse" any item, construction, proprietary device, or activity.

Attending Committee Meetings. The B16 Standards Committee regularly holds meetings, which are open to the public. Persons wishing to attend any meeting should contact the Secretary of the B16 Standards Committee.

NONMETALLIC FLAT GASKETS FOR PIPE FLANGES

1 SCOPE

1.1 General

This Standard covers types, sizes, materials, dimensions, tolerances, and markings for nonmetallic flat gaskets. These gaskets are dimensionally suitable for use with flanges described in the referenced flange standards.

1.2 Relevant Units

This Standard states values both in metric and U.S. customary units. As an exception, diameter of bolts and flange bolt holes are expressed in inch units only. These systems of units are to be regarded separately as standard. Within the text, the U.S. customary units are shown in parentheses or in separate tables. The values stated in each system are not exact equivalents; therefore, it is required that each system of units be used independently of the other. Except for diameter of bolts and flange bolt holes, combining values from the two systems constitutes nonconformance with the Standard.

1.3 Quality Systems

Requirements relating to the product manufacturers' quality system programs are described in Nonmandatory Appendix A.

1.4 References

Standards and specifications adopted by reference in this Standard are shown in Mandatory Appendix II.

2 TYPES AND SIZES

2.1 Types

Dimensions are provided for the following types of gaskets, which are suitable for use with the flange faces indicated.

Gasket Type	Flange Facing
Full face	Flat face
Flat ring	Raised face

2.2 Size

NPS, followed by a dimensionless number, is the designation for normal pipe size, NPS, as described in ASME B36.10M; and is related to the reference nominal diameter, DN, used in international standards. The relationship is as follows:

NPS	DN
$1/2$	15
$3/4$	20
1	25
$1\,1/4$	32
$1\,1/2$	40
2	50
$2\,1/2$	65
3	80
$3\,1/2$	90
4	100

GENERAL NOTE: For NPS ≥ 4, the related DN is DN = 25 × NPS

2.3 Pressure Class Designation

Class, followed by a dimensionless number, is the designation for common flange pressure-temperature ratings as given by the referenced flange standards.

3 MATERIALS

3.1 Composition

Gaskets shall be made of resilient or pliable materials. Metal or nonmetal composites may be incorporated as reinforcement or filler material.

3.2 Service Requirements

Selection of a material suitable for a given service application is the responsibility of the user subject to the requirements of any applicable code or government regulation. The material selected shall be compatible with the fluid and suitable for the pressure-temperature conditions of the service.

4 DIMENSIONS AND TOLERANCES

4.1 Dimensions

Gasket dimensions shall be in accordance with Tables 1 through 9 (Tables I-1 through I-9 of Appendix I) for the flanges standards, sizes, and classes indicated. Selection of gasket thickness is the responsibility of the