ASME B16.20-2023
(Revision of ASME B16.20-2017)

Metallic Gaskets for Pipe Flanges

AN AMERICAN NATIONAL STANDARD

The American Society of Mechanical Engineers

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FOREWORD

Ring-joint gaskets and grooves probably originated in the boiler field, where they were used in various forms for manhole covers, autoclaves, and other closures; however, it was in the oil industry (both in the production and refining of oil) that they received the greatest recognition and were developed into their present form. Their use expanded steadily as temperatures and pressures were increased in steam plants. Tests examining their application in flanges and valves were conducted as early as 1928.

In June 1936, the American Petroleum Institute (API) issued Tentative Standard 5-G-3 on Ring-Joints for Steel Flanges and Flange Unions for use with API Tubular Goods. This standard was known as API Specification 6B, Ring-Joint Flanges. Following the acceptance of ring-joints for flanges and valves by API and the issuance of their standard, ASA B16e on Steel Pipe Flanges and Flanged Fittings was revised to include them, and the 1939 edition included standard dimensions for a full line of ring-joint flanges based on the API standard. Development work continued, and API formulated Standard 6E, Specification for Wellhead Equipment, which included ring-joints not covered in ASA B16e-1939.

In 1949, the American Standards Association (ASA), Sectional Committee B16, Subcommittee 3, Steel Flanges and Flanged Fittings, assembled the available information on ring-joint gaskets into a single standard. ASA approved the Standard, with the designation ASA B16.20-1952, on April 30, 1952.

On April 4,1955, ASA approved an updated edition with the designation ASA B16.20-1955. Ring gaskets for Class 900 (900 lb at that time) in sizes NPS 26 through NPS 36 were added in the next edition, which ASA approved on April 2, 1956. The Standard was again reviewed in 1962, and ASA approved it on April 25, 1963. In 1973, the Standard was revised, and the American National Standards Institute (ANSI) approved it as an American National Standard.

Following publication of the 1973 edition, API requested that ASME convert their gasket standard, API 601, into an ASME American National Standard. As a result of that request, the Standard was expanded to include requirements for spiral-wound and jacketed gaskets that were formerly listed in API 601, 7th edition, 1988. Ring-joint groove dimensions were not included, because they were included in ASME/ANSI B16.5-1988, Pipe Flanges and Flanged Fittings, and ASME B16.47-1990, Large Diameter Steel Flanges. The revised Standard was approved by ANSI on January 22, 1993.

Subsequent editions further expanded the Standard. In the 1998 edition, a quality system program annex was added. In the 2007 edition, metric dimensions were adopted as an independent standard to the U.S. Customary units, and Mandatory Appendix I was added to cover dimensional tables in U.S. Customary units. In the 2012 edition, a new chapter for grooved metal gaskets with covering layers was added.

In the 2017 edition, the entire Standard was reorganized based on the different types of gaskets. In addition, the title of the Standard was revised, as were multiple paragraphs, tables, and figures. Following approval by the ASME B16 Standards Committee, ASME B16.20-2017 was approved by ANSI on October 11, 2017.

In ASME B16.20-2023, all references to double-jacketed gaskets have been removed, material abbreviations have been added as well as guidance for materials not listed in Table SW-3-1; other tables have been updated to align with ASME B16.5 and ASME B16.47. Following approval by the ASME B16 Standards Committee, ASME B16.20-2023 was approved by ANSI on October 9, 2023.

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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Revisions and Errata. The committee processes revisions to this Standard on a continuous basis 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 in the next edition of the Standard.

In addition, the committee may post errata on the committee web page. Errata become effective on the date posted. Users can register on the committee web page to receive e-mail notifications of posted errata.

This Standard is always open for comment, and the committee welcomes proposals for revisions. Such proposals should be as specific as possible, citing the paragraph number, the proposed wording, and a detailed description of the reasons for the proposal, including any pertinent background information and supporting documentation.

Cases

(a) The most common applications for cases are

(1) to permit early implementation of a revision based on an urgent need

(2) to provide alternative requirements

(3) to allow users to gain experience with alternative or potential additional requirements prior to incorporation directly into the Standard

(4) to permit the use of a new material or process

(b) Users are cautioned that not all jurisdictions or owners automatically accept cases. Cases are not to be considered as approving, recommending, certifying, or endorsing any proprietary or specific design, or as limiting in any way the freedom of manufacturers, constructors, or owners to choose any method of design or any form of construction that conforms to the Standard.

(c) A proposed case shall be written as a question and reply in the same format as existing cases. The proposal shall also include the following information:

(1) a statement of need and background information

(2) the urgency of the case (e.g., the case concerns a project that is underway or imminent)

(3) the Standard and the paragraph, figure, or table number

(4) the editions of the Standard to which the proposed case applies

(d) A case is effective for use when the public review process has been completed and it is approved by the cognizant supervisory board. Approved cases are posted on the committee web page.

Interpretations. Upon request, the committee will issue an interpretation of any requirement of this Standard. An interpretation can be issued only in response to a request submitted through the online Interpretation Submittal Form at https://go.asme.org/InterpretationRequest. Upon submitting the form, the inquirer will receive an automatic e-mail confirming receipt.

ASME does not act as a consultant for specific engineering problems or for the general application or understanding of the Standard requirements. If, based on the information submitted, it is the opinion of the committee that the inquirer should seek assistance, the request will be returned with the recommendation that such assistance be obtained. Inquirers can track the status of their requests at https://go.asme.org/Interpretations.

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IMPORTANT INFORMATION CONCERNING USE OF ASBESTOS OR ALTERNATIVE MATERIALS

Asbestos is referenced for use as a filler material in metallic gaskets. It has served as a universal sealing material, compatible with most fluid services. It has been of extreme usefulness in minimizing fire hazards.

Certain serious adverse health effects are associated with asbestos, among them the serious and often fatal diseases of lung cancer, asbestosis, and mesothelioma (a cancer of the chest and abdominal linings). The degree of exposure to asbestos varies with the product and the work practices involved.

Consult the most recent edition of the Occupational Safety and Health Administration, U.S. Department of Labor, Occupational Safety and Health Standard for Asbestos, Tremolite, Anthophyllite, and Actinolite, 29 Code of Federal Regulations Section 1910.1001; the U.S. Environmental Protection Agency National Emission Standard for Asbestos, 40 Code of Federal Regulations Sections 61.140 through 61.156; and the U.S. Environmental Protection Agency rule requiring the labeling and phased banning of asbestos products, published at 51 Federal Register 3738-3759 (January 29, 1986).

There are currently in use and under development a number of substitute materials to replace asbestos in certain applications. Manufacturers and users are encouraged to develop and use effective substitute materials that can meet the specifications for, and operating requirements of, the equipment to which they would apply.

Information concerning safety and health risks and proper precautions with respect to particular materials and conditions should be obtained from one's employer, the manufacturer or supplier of that material, or the Material Safety Data Sheet.

ASME B16.20-2023
SUMMARY OF CHANGES

Following approval by the ASME B16 Standards Committee and ASME, and after public review, ASME B16.20-2023 was approved by the American National Standards Institute on October 9, 2023.

ASME B16.20-2023 includes the following changes identified by a margin note, **(23)**. The Record Numbers listed below are explained in more detail in the "List of Changes in Record Number Order" following this Summary of Changes.

Page	*Location*	*Change (Record Number)*
1	GR-1	First sentence revised *(12-517)*
6	Table RJ-5-2	(1) For ASME B16.5, Class 900, entries for R-14, R-18, R-20, R-24, and R-27 revised *(21-2166)* (2) For ASME B16.5, Class 150 and Classes 300–600, entries for R-80 and R-81 revised *(21-2144)* (3) Note (3) added *(21-2166)*
14	SW-2.5	Sentence below subpara. (c) revised *(21-2168)*
15	SW-2.6	First paragraph and subpara. (b) revised *(21-929)*
15	SW-3	Revised *(18-2515)*
15	SW-4.1	Subparagraph (f) revised *(21-2168)*
17	Table SW-2.1-1	(1) NPS 22 added *(19-856)* (2) Note (5) revised and Note (6) added *(19-856)*
24	Table SW-2.1-4	(1) NPS 22 added *(19-856)* (2) Note (1) revised and Note (2) added *(19-856)*
27	Table SW-2.5-1	NPS 3½ and NPS 22 added *(19-856)*
28	Table SW-2.5-2	(1) NPS 3½ and NPS 22 added *(19-856)* (2) For NPS ½ through NPS 3½, Classes 400 and 900, entries revised *(19-856)*
31	Table SW-3-1	Revised in its entirety *(18-2515)*
33	Part JA	Deleted *(12-517)*
37	Table GM-2.1-1	(1) NPS 3½ and NPS 22 added *(21-2145)* (2) Note (4) revised *(21-2145)*
44	Mandatory Appendix I	Updated

LIST OF CHANGES IN RECORD NUMBER ORDER

Record Number	Change
12-517	Removed all references to double-jacketed (DJ) gaskets from ASME B16.20.
18-2515	Revised Table SW-3-1 material abbreviations and para. SW-3. Included a larger range of materials used in construction. Added guidance for abbreviations for materials not listed in the table.
19-856	Added NPS 22 in Tables SW-2.1-1, SW-2.1-4, SW-2.5-1, and SW-2.5-2 to match what is currently in B16.5 and B16.47, and added new Notes.
21-929	Clarified spiral-wound gasket performance testing requirement.
21-2144	Added ring-joint gasket for 22 in. NPS ASME B16.5 flanges to ASME B16.20.
21-2145	Updated Table GM-2.1-1 to include 3½ in. NPS and 22 in. NPS ASME B16.5 flanges.
21-2166	Revised Table RJ-5-2 to add a Note to ½ in. to 2 in. for Class 900.
21-2168	Corrected "outer ring" to "centering ring." The term "outer ring" exists only within para. SW-2.6.

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PART GR
GENERAL REQUIREMENTS

(23) GR-1 SCOPE

This Standard covers materials, dimensions, tolerances, and markings for metal ring-joint gaskets, spiral-wound metal gaskets, and grooved metal gaskets with covering layers. These gaskets are dimensionally suitable for use with flanges described in reference flange standards ASME B16.5, ASME B16.47, API Specification 6A, and ISO 10423.

GR-2 QUALITY SYSTEMS

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

GR-3 REFERENCES

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

GR-4 RELEVANT UNITS

This Standard states values in both SI (Metric) and U.S. Customary units. These systems of units are to be regarded separately as standard. Within the text, the U.S. Customary units are shown in parentheses. 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. Combining values from the two systems constitutes nonconformance with the Standard.