



Standard Practice for Determining the Maintenance Factor (m) and Yield Factor (y) Loading Constants Applicable to Gasket Materials and Designs¹

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1. Scope

1.1 This practice will establish criteria for determining loading constants that are referenced in the American Society of Mechanical Engineers (ASME) pressure vessel design (Boiler and Pressure Vessel Code, Section VIII, Divs. 1 and 2). These constants are specific to this design criterion for metallic, semi-metallic, and nonmetallic gaskets.

1.2 *Units*—The values stated in inch-pound units are to be regarded as the standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

1.3 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:²

D2000 Classification System for Rubber Products in Automotive Applications

F104 Classification System for Nonmetallic Gasket Materials

F868 Classification for Laminated Composite Gasket Materials

2.2 ASME Standards:³

B16.5 Pipe Flanges and Flanged Fittings: NPS 1/2 through NPS 24 Metric/Inch Standard Boiler and Pressure Vessel Code Section VIII, Divs. 1 and 2

PCC-1 Guidelines for Pressure Boundary Bolted Flange Joint Assembly

2.3 DIN Standard:

DIN 3535 Gaskets for Gas Supply⁴

2.4 FSA Standard:

FSA G 605:11 Standard Test Method for Determining (m) and (y) Loading Constants Applicable to Gasket Materials and Designs⁵

3. Terminology

3.1 Definitions:

3.1.1 *gasket contact area, A_1 , n* —gasket area in contact with the flange surfaces and under load.

3.1.1.1 *Discussion*—The gasket contact area described in this practice can deviate from the effective area described in the ASME pressure vessel design.

3.1.2 *leak rate, n* —volumetric leak rate per inch gasket outside diameter.

3.1.3 *maintenance factor, m , n* —factor that is required to calculate the additional flange fastener preload needed to maintain a seal after internal pressure is applied to a joint.

3.1.4 *surface stress, n* —stress applied to the gasket contact area and equal to the applied load divided by gasket contact area.

3.1.5 *yield factor, y , n* —factor that provides the gasket minimum design seating stress required to seal a joint upon assembly.

3.1.5.1 *Discussion*—This assumes no pressure and, therefore, a lack of hydrostatic end load effect on the assembly. Reported in psi.

4. Significance and Use

4.1 The gasket factors are a function of leak rate; therefore, this practice generates curves. Constants for use in the ASME Boiler and Pressure Vessel Code, Section VIII, Appendix 2

¹ This practice is under the jurisdiction of ASTM Committee F03 on Gaskets and is the direct responsibility of Subcommittee F03.40 on Chemical Test Methods.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

³ Available from American Society of Mechanical Engineers (ASME), ASME International Headquarters, Two Park Ave., New York, NY 10016-5990, <http://www.asme.org>.

⁴ Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, <http://www.ansi.org>.

⁵ Available from the Fluid Sealing Association, 994 Old Eagle School Rd., #1019, Wayne, PA 19087-1866.