

Bulletin

To: General Distribution Date: November 11, 2013

From: Applications Engineering Subject: ASME B16.20 – Metal Gaskets for Pipe

Flanges

Over the past few years, there have been several changes to the ASME B16.20, which is a dimensional specification for metal gaskets used in pipe flanges. The intent of this bulletin is to provide a brief, concise overview of the more impactful changes that have been made.

## **Inner Rings Required**

The May 2008 ASME B16.20 release contained metric dimensioned tables (2007 rev), and the rules concerning the use of inner rings on spiral wound gaskets were amended to make inner rings standard (see below):

3.2.5 - Inner Ring. Inward buckling of spiral wound gaskets has been identified as a potential problem. Inner rings shall be furnished with all spiral-wound gaskets having PTFE (polytetrafluoroethylene) filler material. Inner rings for flexible graphite filled spiral wound gaskets shall be furnished unless the purchaser specifies otherwise. For all filler materials, inner rings shall be furnished in spiral wound gaskets for:

- a) NPS 24 and larger in Class 900
- b) NPS 12 and larger in Class 1500
- c) NPS 4 and larger in Class 2500

Inner rings are required for these gaskets due to high available bolt loads, which may result in outer ring damage. The inner ring thickness shall be from 2.97 to 3.33mm (0.117 to 0.131 in). Tables 12 through 14 (Tables I.12 through I.14 of Appendix I) show inner ring inside diameters that may extend a maximum of 1.5mm (0.06 in.) into the flange bore under the worst combination of flange bore, eccentric installation, and tolerance. Gaskets with inner rings should be used only with socket welding, lapped, welding neck, and integral flanges. Reference Table 15 for minimum pipe wall thickness for use with gaskets with inner rings. Reference Tables 16, 17 and 18 (Tables I.16 and I.17 of Appendix I) for maximum allowable bore for use with gaskets without inner rings.

It is worth noting that the standard states that all graphite filled spiral wound gaskets will be furnished with inner rings unless otherwise specified by the purchaser. In order to receive a spiral wound gasket without an inner ring, purchasing must specifically state that no inner ring is required when placing an order. However, even if the gaskets are purchased without the inner ring the gasket will be stamped in compliance to B16.20. This change only affects graphite filled spiral wounds, since the inner rings were already required for PTFE-filled spirals.

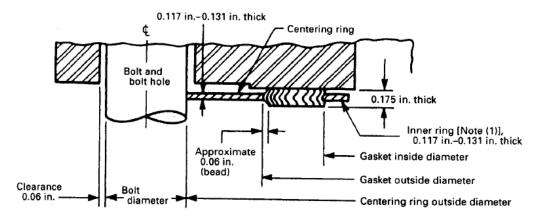
## **Gasket (Winding) Outer Dimensions**

ASME B16.20 is a dimensional specification for various types of metal gaskets. However, the measurement of outer dimension of the winding (referred to as the Gasket Outside Diameter in

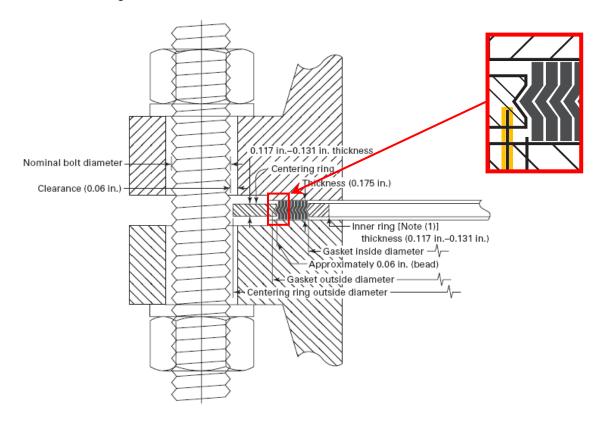


B16.20) has been somewhat ambiguous and left open to interpretation. It is our belief that the confusion is due to the fact that the specification verbiage does not state how to measure the dimension and the schematics that reference the dimension have not been clear in the past (see below example schematics taken from previous version of B16.20):

**ASME B16.20 – 1998 (Table 9)** – schematic is not accurately scaled and dimension references are difficult to see.

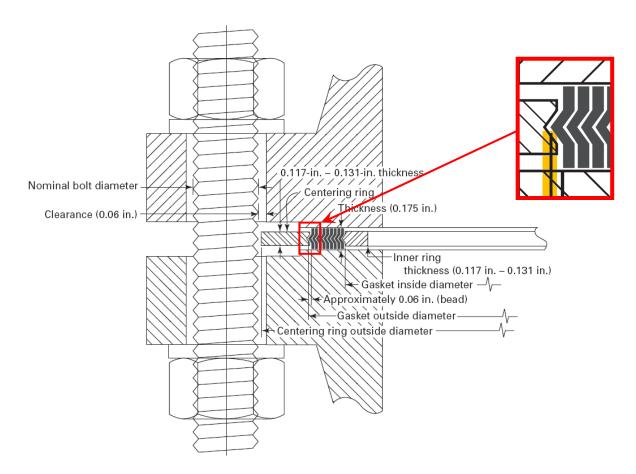


**ASME B16.20 – 2007 (Figure I-4)** – Schematic is much easier to read, but certain dimension references are still not properly placed. For example, see "Gasket outside diameter", which is highlighted in orange below. The reference line is not pointing to the bead of the winding where it should be.



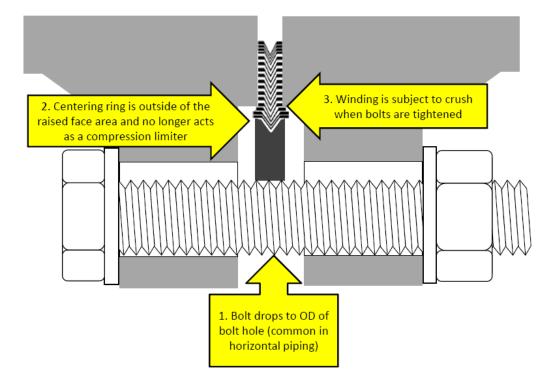


**ASME B16.20 – 2012 (Figure I-1)** – ASME Subcommittee G committee members corrected the drawing so that the "Gasket outside diameter" reference line points to the outside of the winding bead <u>NOT</u> the groove in the outer ring (highlighted below in orange). The outer edge of the bead IS the correct location for measuring the gasket outside diameter to validate compliance with ASME B16.20.



**NOTE:** One of the concerns expressed with ASME B16.20 dimensions is that the standard specifies "gasket outer diameters" that can potentially places the windings outside of the raised face contact surface of ASME flange, due to the clearance between the bolt holes and bolts. If the outer diameter of the winding is outside the outer diameter of the raised face area, the outer retainer ring (which also acts as a compression limiter) will not function properly and may allow the windings to be over compressed (see below).





If this is a concern of your customers, we suggest considering the Garlock EDGE® Gaskets, as these gaskets have a reduced outer diameter to address this concern, among features which provide additional benefits over conventional spiral wound gaskets. However, keep in mind that the EDGE® gasket, while an improved design, does not meet the dimensions specified in B16.20.

## **Kammprofile Gaskets**

In June 2012 "grooved metal gaskets with covering layers" (kammprofiles) were added to ASME B16.20. The specification is very clear about the method of construction, finished product dimensions as well as the required markings on the gaskets.

You may encounter "hybrid" metal gaskets in the industry that are a cross between a spiral wound and kammprofile gasket. One such design is a thick, extruded wire that is spiral wound and welded to look like a kammprofile. However, products, such as this, are NOT ASME B16.20 compliant. Per section 5.2.2 of the specification:

Grooved metal gaskets with covering layers shall be constructed as a concentrically grooved metal core (sealing element) with a centering ring.

Please contact Applications Engineering if you have any questions!