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## ANALYSIS OF THE COMPRESSION BEHAVIOR OF SPIRAL WOUND GASKETS

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### ABSTRACT

Recent updates to the ASME B16.20 standard for spiral wound gaskets now require inner rings on all flexible graphite and PTFE filler spiral wound gaskets [1]. This new requirement is intended to prevent the occurrence of inward buckling; however the addition of an inner ring can have significant impact on the spiral wound gasket compression behavior and possibly its sealing performance. This paper explores the compression behavior and sealing performance of spiral wound gaskets, with and without inner rings, and thus provides a better understanding of their performance capabilities in ASME B16.5 flanges, as well as their design and performance within ASME Boiler & Pressure Vessel Code Appendix 2 flanges [2].

### INTRODUCTION

Spiral wound gaskets are constructed of alternating plies of formed metallic wire and soft filler, spirally wound into the desired gasket shape as sketched in Fig. 1.

When used in pipe and pressure vessel flanges, spiral wound gaskets are often constructed with an outer metallic guide ring which serves several important purposes including

centering the spiral wound sealing element in the proper position on the flange, and to prevent gasket compression beyond its design limit. Typical soft filler materials include PTFE and flexible graphite. Depending upon the characteristics of the specific fillers, and the changes to these characteristics during the manufacturing process, these fillers compress or deform and extrude axially from between the metal windings as the gasket is compressed, and create a seal against the flange faces. The spiral winding, or sealing element of spiral wound gaskets constructed per the ASME B16.20 specification have a nominal, uncompressed wire height of 0.175", an overall gasket thickness of about 0.185", and the outer guide ring surrounding it is nominally 0.125" thick. When properly compressed between flanges, the winding is compressed approximately 0.060", and further compression is limited by the outer guide ring or centering ring as shown in Fig. 2.



Figure 1 Cross sectional view of windings-only spiral wound gasket [3]

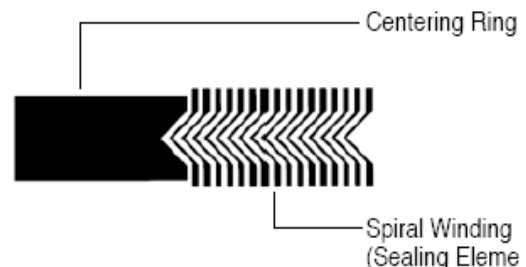


Figure 2 Cross sectional view of spiral wound gasket with outer centering ring [3]