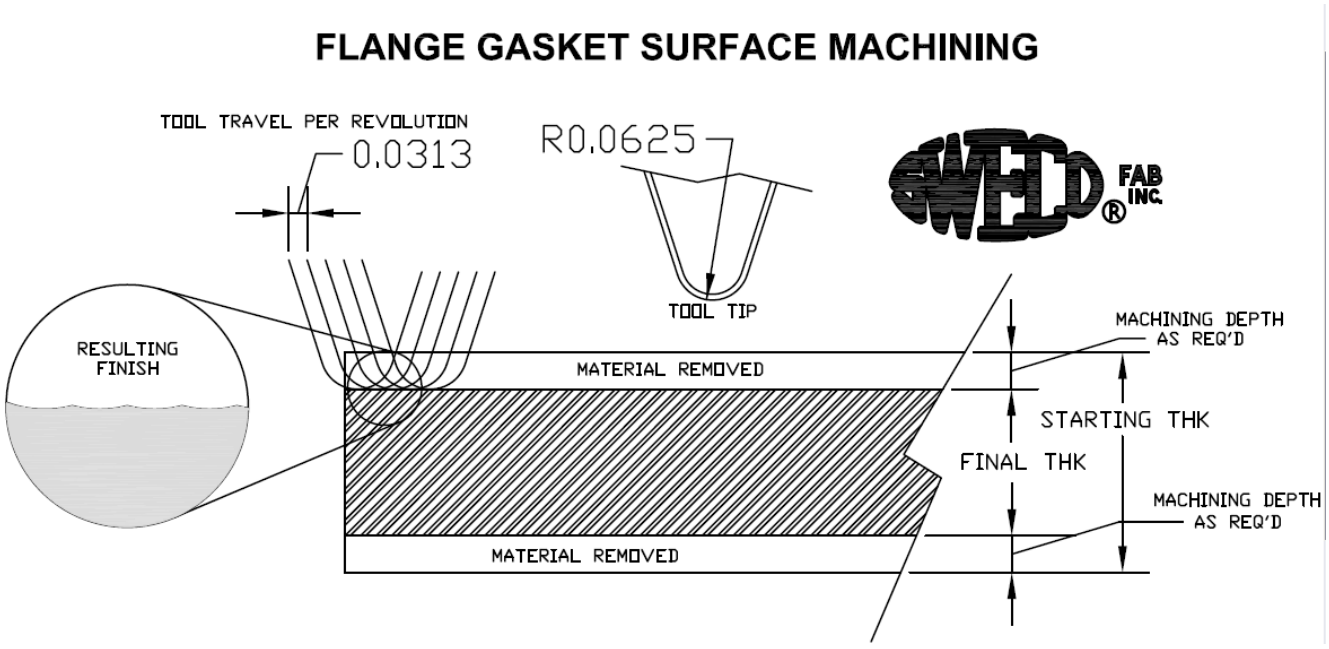
Paddle and Figure Eight Blinds

Blinds are among the main means used to gain a complete shutoff in process piping. I will discuss two types, the paddle blind and the spectacle blind, or figure 8. The paddle blind is a round piece of metal thick enough to withstand pressure to which it will be be subjected, inserted between two flanges, with a gasket on each side, and tightened. The second type, the figure eight blind, works exactly the same way when stopping flow, but on one end of the spectacle blind is an opening to be used as a spacer between two flanges when the blind portion is not in use. Often when paddle blanks are used, a matching spacer is inserted between the flanges when the line is returned to service.

Figure 8 blinds, paddle blinds, skillet blinds, spades, whatever you call them, are designed to fill provide a positive shutoff and are always sandwiched between two flanges. These flanges are usually raised face, flat face, or ring type and are often defined by ASME B16.48 in conjunction with B16.5 (Flanges through 24") and B16.20 (Gasket standard).

When you look at B16.48 you will find the standard is basically dimensional and the inside spacer (ID)dimensions are determined by an algorithm stated in B16.48 Section 4.3 while the outside dimensions are B16.5 bolt hole circle minus one bolt hold diameter, thus the OD forms a circle tangent to the bolt holes.

The B16.48 standard specifies that the thickness tolerance must be plus 1/8" or 3/16" (+ 3 or 4.8 mm) (depending on OD) with a minus zero tolerance. For this reason we make spectacle blinds from material that starts 1/8 inch thicker than the requirement and machine down a bit for the phonograph groove if B16.48 is required by a customer. B16.48 is a the Cadillac or Lexus of the line blinds. You CAN specify a raised face on these blanks, but we have never done that in recent memory. In that case we would need to machine the center portion so that it is lower than the gasket surface. There is no standard amount for this defined in B16.48, only the statement in B16.48 section 3.3.1 that a raised face can be specified at the option of the purchaser. This would add machining time and complexity so the price would be higher. Call this the Bently or Rolls Royce of the line blind world.



We can also make Fords. You avoid a lot of machining by using a different system of standards. To do this you still follow the same rules as before in 16.48 for ID, OD and C-C spacing, but use B 31.3 to determine the thickness.

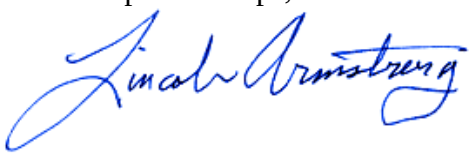
B31.3 section 304.5.3 provides a formula for determining thickness. This thickness will almost always be slightly less than the thickness you get from B16.48. This means you can start with a given thickness and take a minimal amount of material away to form the phonograph grooves. This is less material and less machining.

$$t_m = d_g\sqrt{\frac{3P}{16SE}} + c$$

In this formula dg is found in B16.20 and is the gasket ID for a given size of flange. P is the design pressure which you can take from B16.5 standards, S is the allowable stress value for your material from Table A-1 in B31.3, and E is 1 unless the material is welded or cast in which case you get a quality factor from Table A1-A or A1-B, again in B31.3. The c is for a corrosion allowance which can be whatever you want, but is usually zero for blanks being used for lockout safety reasons. If the blank is being used for a section of piping being kept out of service with full contact with process fluids on one or both sides, a corrosion factor makes sense.

Finally, a lot of companies leave out the gasket surface entirely. The mill finish of typical SA516-70, SA-36, SA240-304, etc. is within the range where a spiral wound gasket will work without leaking, thus eliminating another cost, the machining.

Hope this helps,



SWECO Engineering Manager
(713)731-0030 Ext. 123
(713)452-4767 Direct
(713)731-8640 FAX

SWECO Fab Division of
Piping Technology and Products, Inc.
http://www.pipingtech.com
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