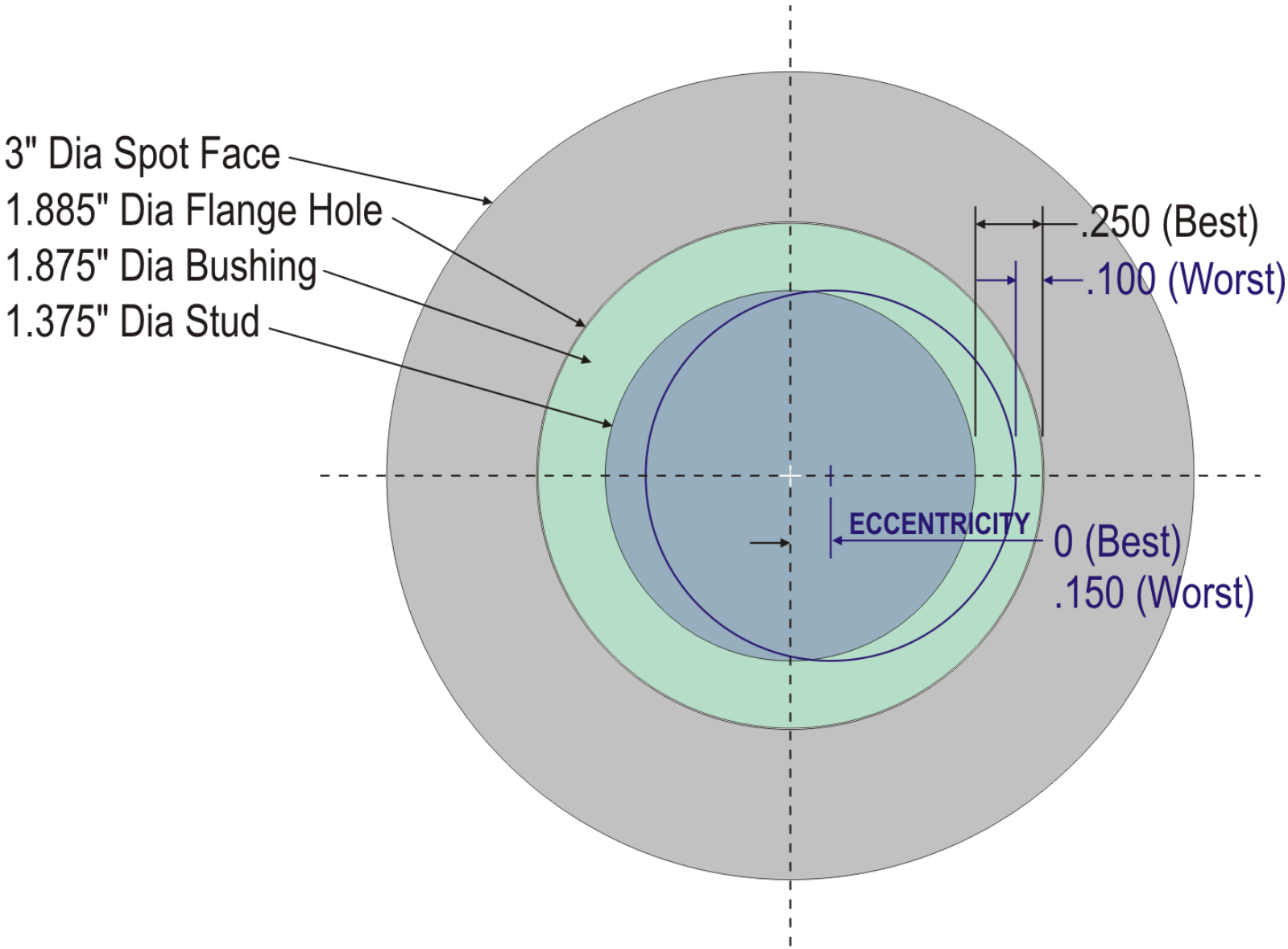
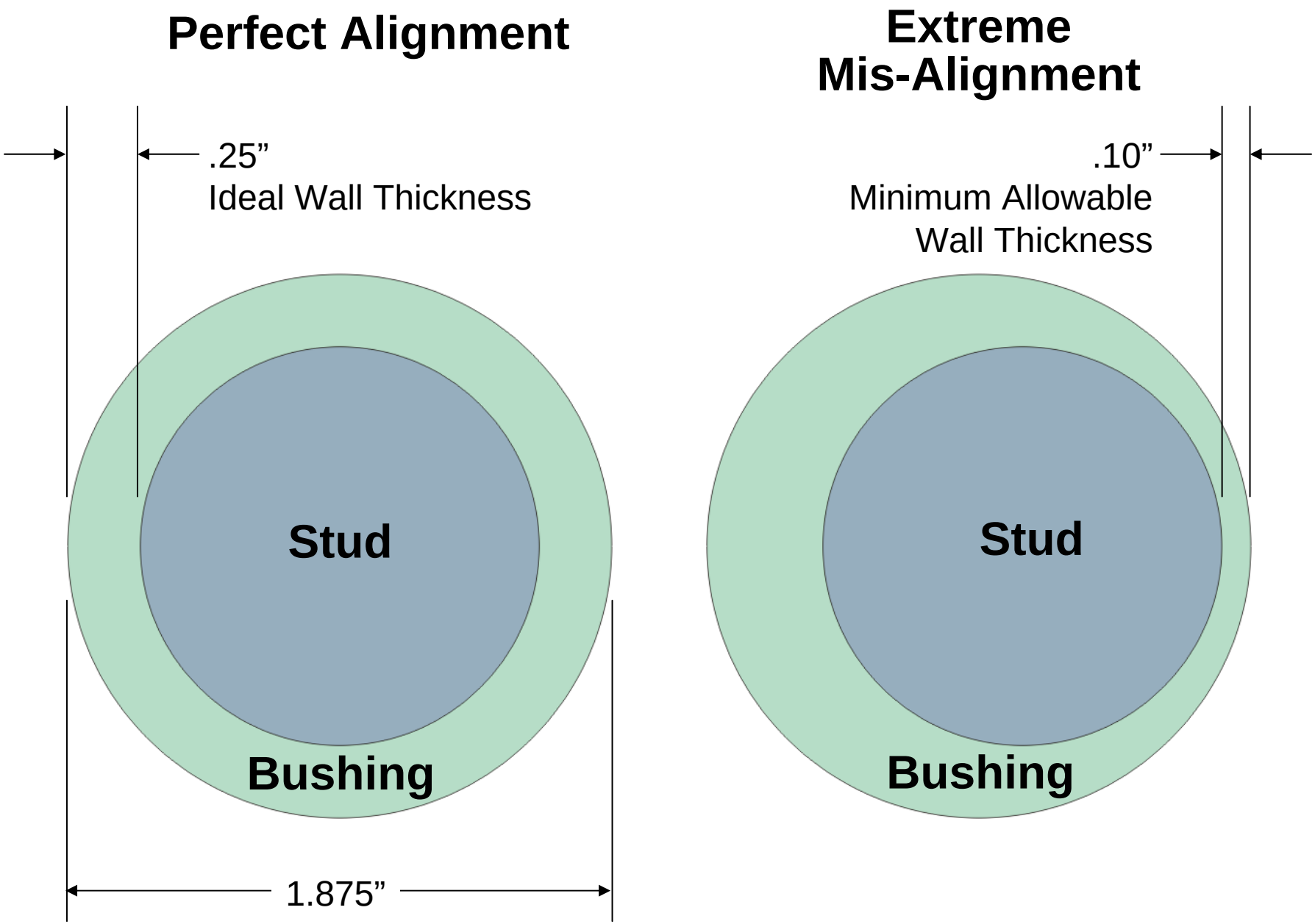
Offset of stud CL to the hole CL

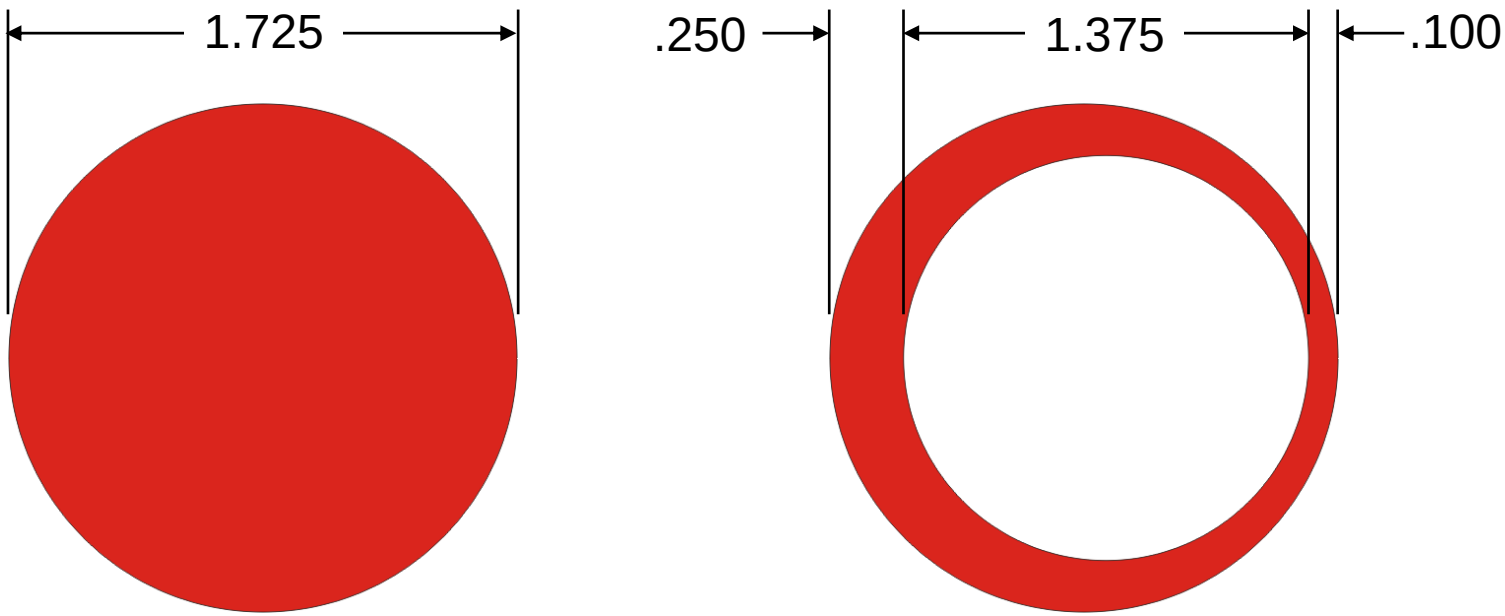



Perfect Alignment
.25”
Ideal Wall Thickness
Stud
Bushing
1.875”
Extreme
Mis-Alignment
.10”
Minimum Allowable
Wall Thickness
Stud
Bushing

Designing a gage to measure the center offset of 2 holes

1.375” (bored stud diameter)
+ .250” (ideal wall thickness)
+ .100” (minimum wall thickness)

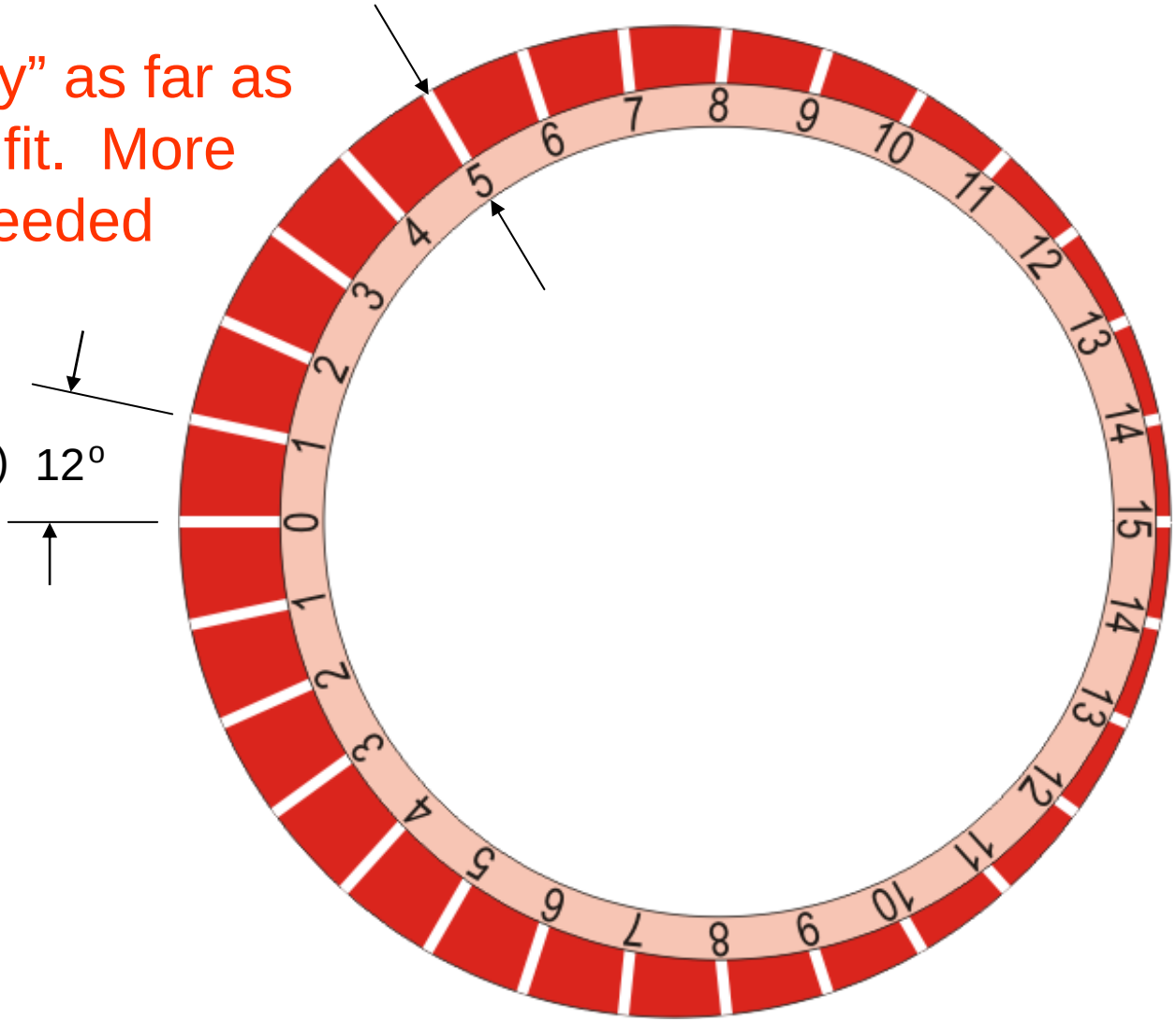
1.725” outer diameter of gage

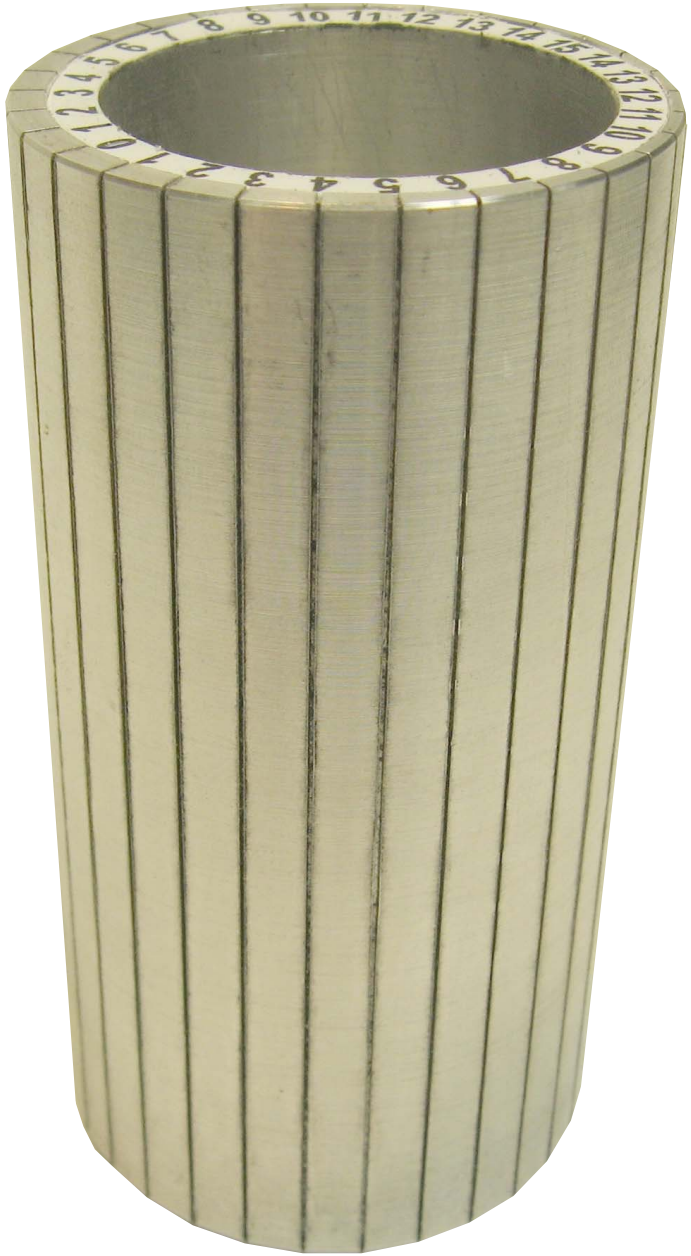


.250 - .100 = .150 (difference in wall thicknesses)
.150/ 15 = .010 difference per division

.010 is too “sloppy” as far as a good, accurate fit. More increments are needed

(15 divisions each side) 12°




1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 10 9

Determining the gage increments

Take the average of the wall thicknesses

.250 (thickest wall) + .100 (thinnest wall) = .350 / 2 = .175 (average)

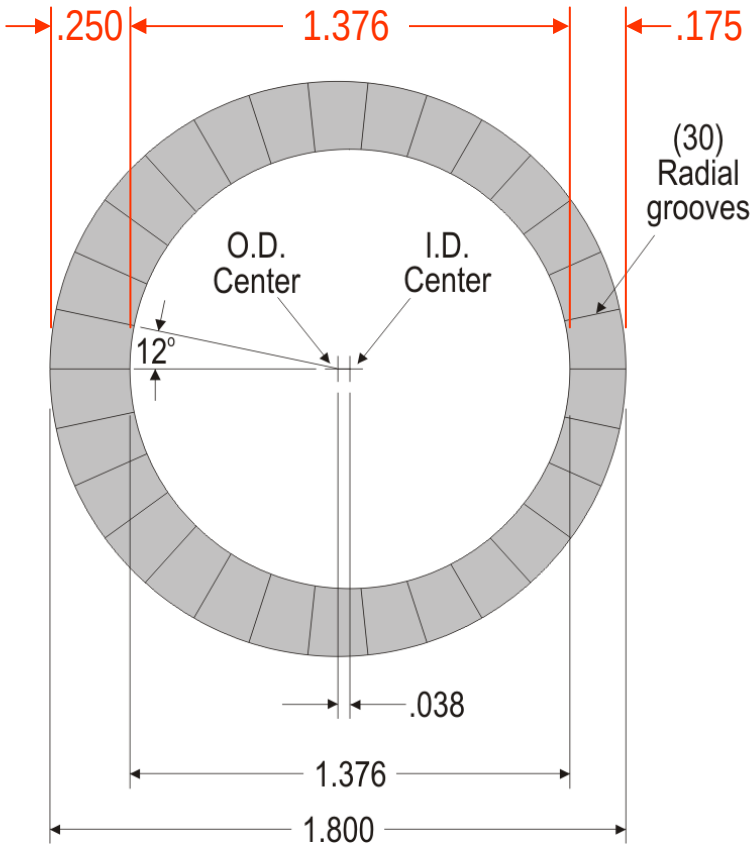
Make 2 gages

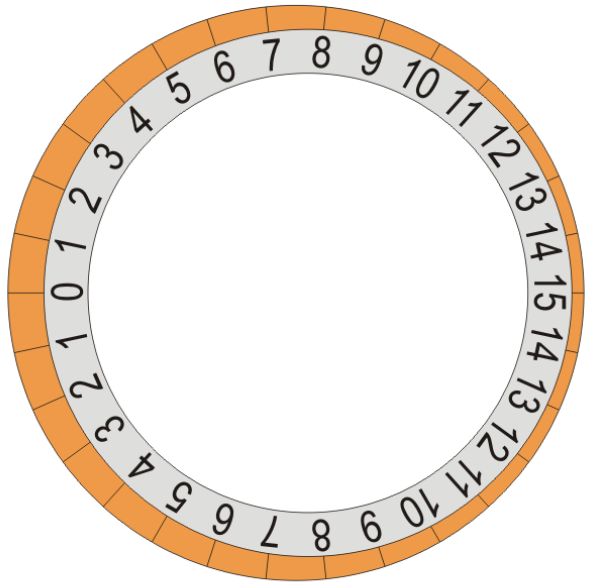
One gage measures thickness from .250 to .175

One gage measures thickness from .175 to .100

By using the same number of increments on the gages,
the smaller and more accurate each increment becomes.

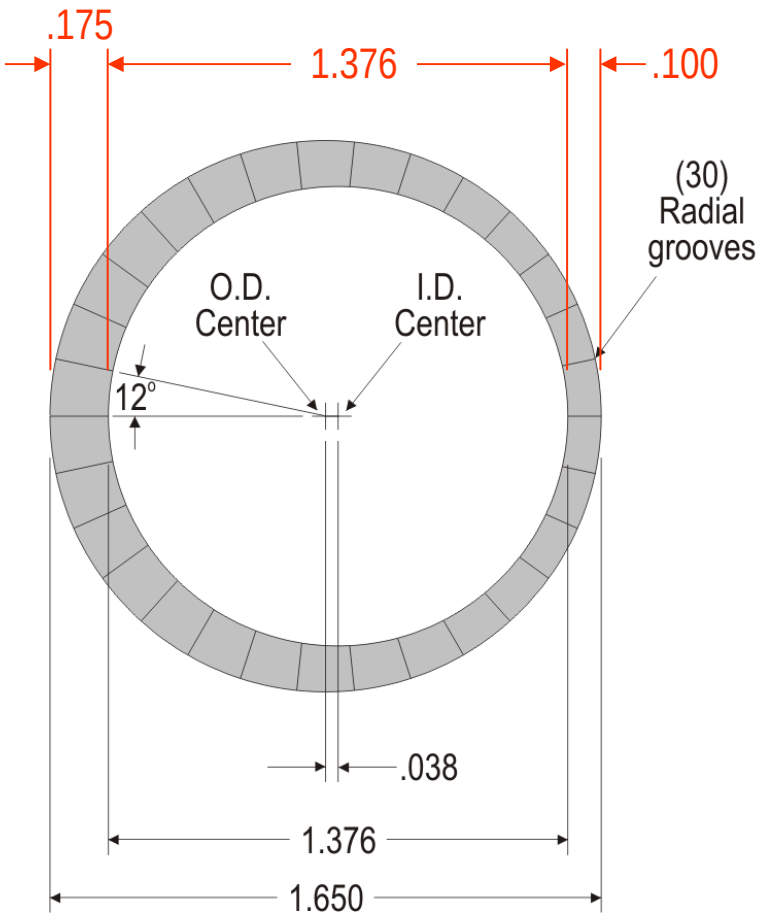
Gage to measure from .250 to .175

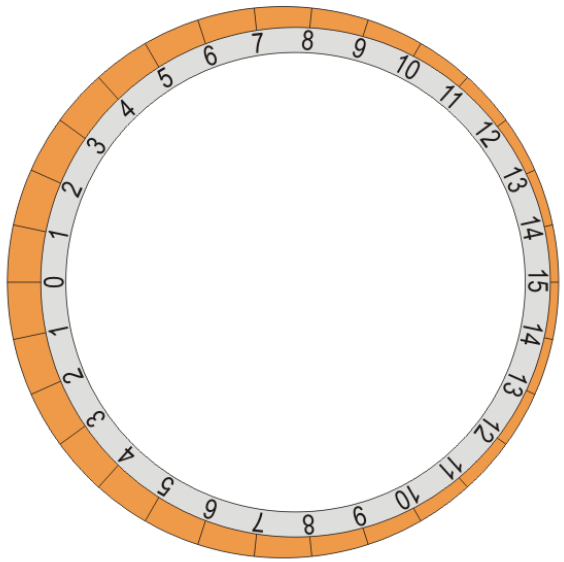




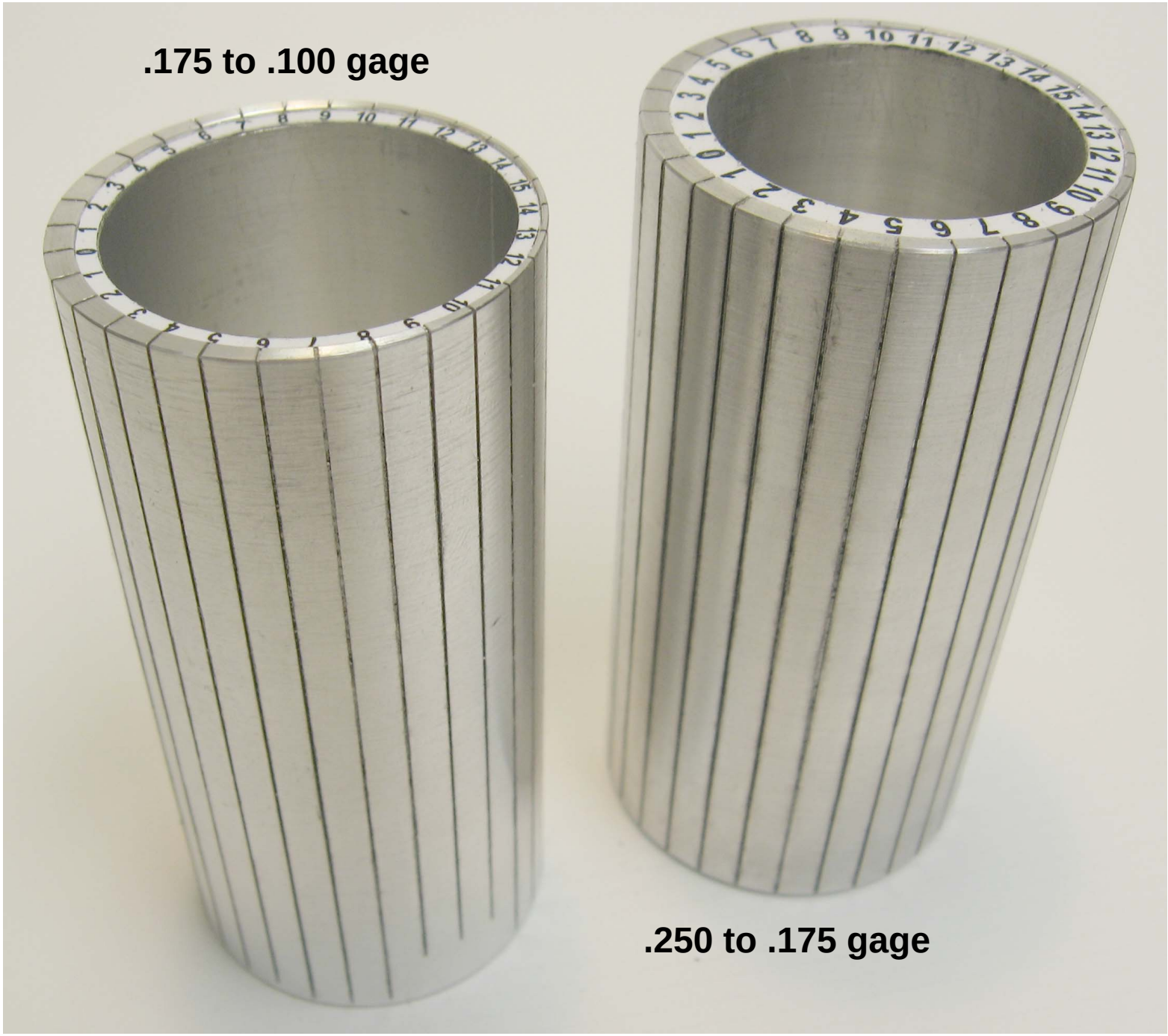
Hole No.	Min. Wall	Center Offset
(15)	.175	(.075)
(14)	.176	(.074)
(13)	.178	(.072)
(12)	.183	(.067)
(11)	.188	(.062)
(10)	.194	(.056)
(09)	.202	(.048)
(08)	.210	(.040)
(07)	.217	(.033)
(06)	.225	(.025)
(05)	.232	(.018)
(04)	.238	(.012)
(03)	.243	(.007)
(02)	.247	(.003)
(01)	.249	(.001)
(00)	.250	(.000)

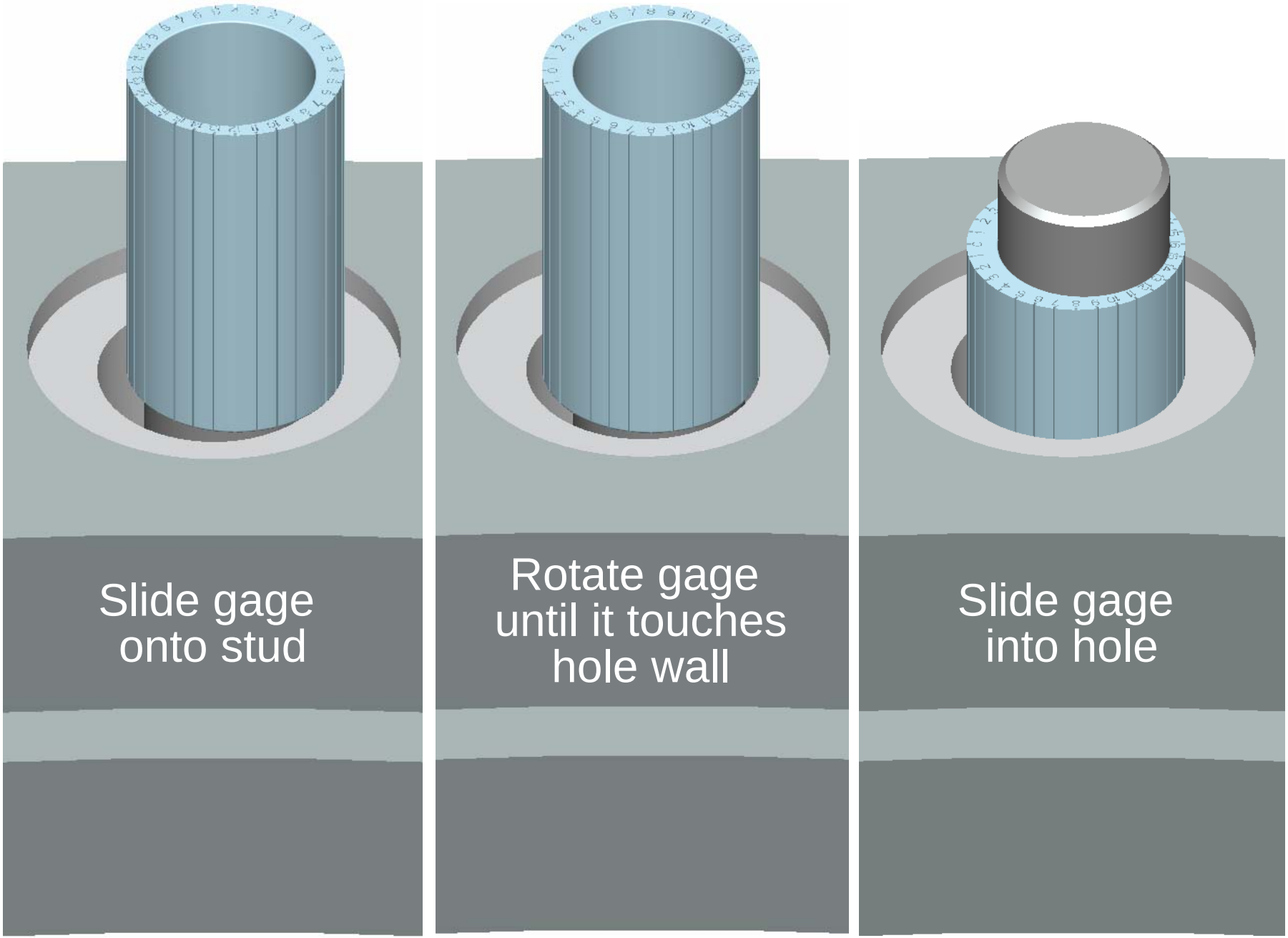
Gage to measure from .175 to .100



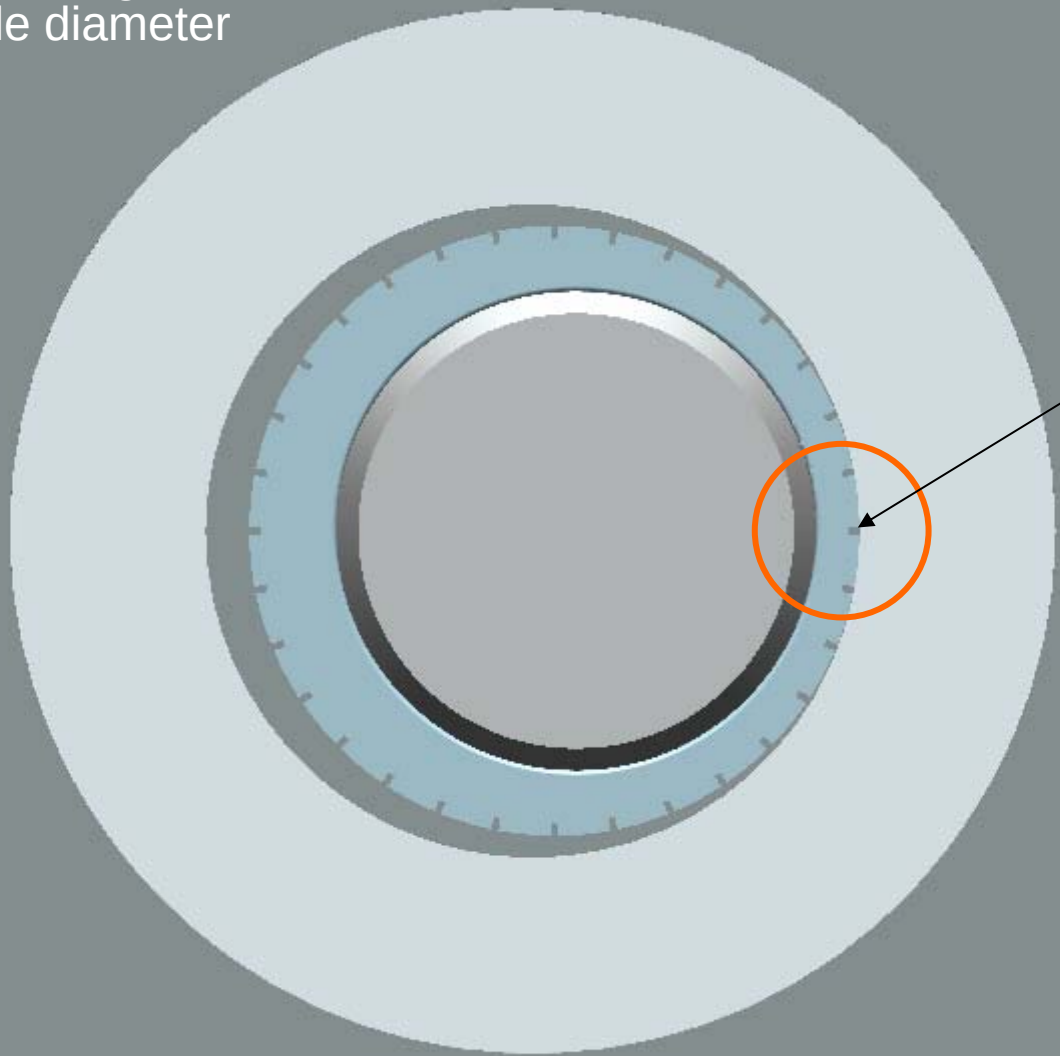


Hole No.	Min. Wall	Center Offset
(15)	.100	(.150)
(14)	.101	(.149)
(13)	.103	(.147)
(12)	.108	(.142)
(11)	.113	(.137)
(10)	.119	(.131)
(09)	.127	(.123)
(08)	.135	(.115)
(07)	.142	(.108)
(06)	.150	(.100)
(05)	.157	(.093)
(04)	.163	(.087)
(03)	.168	(.082)
(02)	.172	(.078)
(01)	.174	(.076)
(00)	.175	(.075)


.175 to .100 gage
.250 to .175 gage

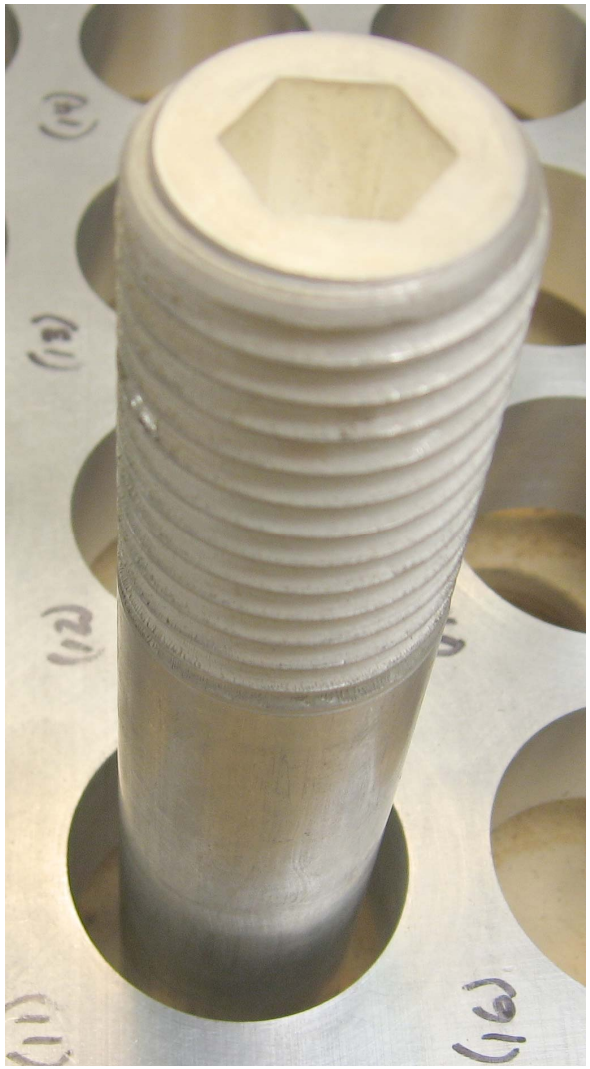

Slide gage onto stud
Rotate gage until it touches hole wall
Slide gage into hole

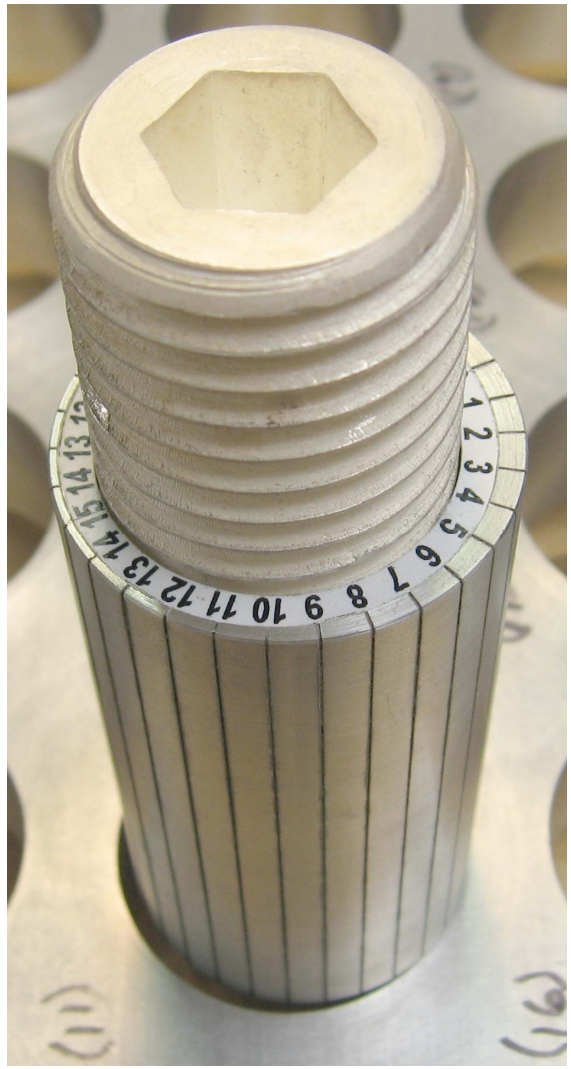
Top view showing the gage rotated until it is tangent with the hole diameter



Determine the hole number on the gage and find the center offset from the chart


(1)
1.886
(2)
(3)
(4)
(5)
(6)
(7)
(8)
(9)
(10)
(11)
(12)
(13)
(14)
(15)
(16)
(17)
(18)
(19)
(20)
(21)
(22)
(23)
(24)
(25)




1 2 3 4 5 6 7 8 9 10 11 12 13 14 15